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Thursday, January 4, 1979

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Briefing

Robots 79 conference

INDUSTRIAL robots in the UK will be the main topic of a four-day conference called Robots 79, to be held at the University of Warwick between March 27 and April 1. Experts in robotics will participate in four specific sessions, dealing with applications, new equipment, research and development trends, and the social and economic aspects and governmental involvement in robotics. There will be a large display of industrial robots, and the event is organised by the British Robot Association, Bedford.

CS loss

WHILE expanding rapidly in revenue terms, Main Computer Systems Inc. of Elmford, New York, has filed for Chapter 11 protection in the US Bankruptcy Court in New York City on December 31, mainly because of a loss of nearly \$10 million in the fourth quarter. In the 1978 financial year, the company reported a net loss of nearly \$14 million compared with less than \$1 million in 1977, when the turnover was \$10.5 million and profit of \$827,432.

takeover

AGREEMENT in principle has been reached by Commodore International to acquire the UK stock of Miles Display Systems Inc. of Dallas. The company is currently owned by two investors, Daniel Salas and Steve Salas.

series date

WEDNESDAY, January 31 is the date pencilled in by the organisers for the announcement of the results of the 1978 football pools. The entry-level machine is expected to be about four times as powerful as the 370/115 (11 times as previously reported) (CW, December 14), an Oransky, analysed with the aid of New York, because IBM may aim its primary at users of the first 12 months of the year, rather than at its own base.

al version

IBM System/34 is the latest line for which Cincom has implemented its database management system Total In-Ed in the US, the software is expected to be a multi-tasking version, a single copy of which can support multiple on-line tasks simultaneously.

comp denial

THE firm denial by Modest finance manager under Giles that either any was involved, Wall Street observers still say that And Gould are the unlikely companies seeking a full takeover and an 80 per cent stake in the A-based minicomputer.

PO pay dispute threat to Prestel and System X

DISCONTENT over pay among operations and programming staff in the Post Office's data processing service is threatening the operation of computer centres handling Prestel, Giro and PO billing and payroll applications, as well as the continuing development of the all-

electronic System X.

Plans for strike action later this month have already been laid by the staff's union, the Society of Civil and Public Servants. The dispute centres around a regrading claim that seeks to give them parity with white-collar engineers in the PO.

"The claim is for about 1,400 computer staff," said an SCPS spokesman. "and has been made because we have fallen behind on pay. Some engineers earn up to £1,000 more than equivalent computer or clerical staff. This is one of the major reasons that we now see a turnover rate of about 20 per cent for people in the data processing service."

This is not only the concern of the PO data processing service, however, as the same problem has already been highlighted by SCPS deputy general secretary Campbell Christie, who is fighting for higher pay and better

conditions for all members. In November 1978, Christie, who had presented, however, a meeting of data processing staff was held in November at which the motion voted by two to one to take

Turn to page 10

United drops out of leasing

ONE of the best known third party computer lessors, United Leasing, is dropping out of the computer leasing business because of the rapid fall in the

price of IBM CPUs. The chairman of United, Parry Mitchell, told Computer Weekly that United would probably stop writing leases of IBM machines for the middle of this year.

He said, "It has been estimated that CPU sales will account for more than about 15 per cent of IBM's revenues by 1985. With CPU's costing no more than about \$100,000 by then it will not be worth remarketing them when the lease period terminates."

Asked to comment on whether he thought it would be worthwhile writing leases on CPUs in the future, Peter Doyle, president of the newly-formed European Computer Trading and Leasing Association (CW, November 23, 1978), said he expected that the percentage pro-

fit margin to be made on a CPU in the future would be higher than now, even though its value might be lower.

United's decision is the latest development in an industry saga concerning the declining value of IBM CPUs which until now has centred primarily on plummeting residual values. Late in 1977 Computer Weekly exclusively reported that high underwriters were no longer prepared to insure the residual values of machines on cheap long-term leases with break clauses (CW, December 9, 1977).

The Lloyd's Insurance was used mainly by US-based third party lessors of which United is the best known in Europe. United admitted a few weeks ago that it had already written new leases on 25 machines whose original

WIN A PRIZE

A PC personal computer is waiting to be won in a competition organised by the consultancy firm Combridge of London for The Computer Advertisement of the Year. It is intended to promote high standards in advertising design for computer products and services. Advertisement that have appeared in the UK Press since April 1978 are eligible for entry. There will be three categories: hardware, software, and computer-related products and services. The winner of each category will receive a prize of £1,000 and a plaque. The overall winner will receive the PC worth £1,000.

There will be an entry fee of £10 for each advertisement. All these fees will be donated to the BCS Spurchest Group for the Disabled, at the prizes are being provided by Combridge. Entry forms can be obtained from Melissa Bagg of Dunsbury Hollow on 01-235 4966.

Atom 'bomb' hits ICL shares

REPORTS that ICL could face problems over the use of American parts in 2800S on order for the Atomic Energy Authority, have wiped much of the shine off the company's share price.

Despite ICL confidence that the problem, which arises from a new US Act designed to curb the spread of nuclear weapon technology, will prove trivial, the shares have plunged 20 pence since the news broke. Euphoria over the company's strong performance in 1977-78 — profits of £37 million on turnover of £509 million (CW, December 21-28, 1978) has largely evaporated.

At issue are the Intel chips which will be used in the two dual 2870s and one 2880 processor on order for the UK Atomic Energy Authority under a £13 million contract (CW, September 14, 1978).

The new US Act, passed in March, requires that all US ex-

ports for use in nuclear technology, be approved by the US Department of Commerce since the establishments which will use the computers are not involved in nuclear weapons. ICL is confident that approval will be granted with minimal delay.

Looking forward, and considering the company's strong performance in 1977-78, the fact that the computers are not involved in nuclear weapons, ICL is confident that approval will be granted with minimal delay.

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Prof George on a winner

HAVING raised a few eyebrows in the world of football pools with his accurate forecasts of match results (CW, December 21/28), Professor Frank George, head of the cybernetics department at Brunel University, is turning his attention to horse-racing.

The accuracy of Professor George's Forecast 4 pools system was demonstrated on the December 22 television programme Times at Six.

During this he predicted that three matches — Queens Park Rangers v Tottenham Hotspur, Aston Villa v Leeds United, Ipswich Town v Norwich City

— would all be score draws.

This was proved correct and the respective scores were: 2-2, 2-2 and 1-1.

"I did mention that there was a small chance of Tottenham winning, but maybe I shouldn't have," said Professor George.

Now, he has turned his attention to aiding the racing pundits in their attempts to predict which horse will be first past the winning post.

Professor George says that the system, being written in Algol 68, will soon be up and running.

COMPUTER WEEKLY'S INSIDE NEWS

1984 AND ALL

THAT

THE New Year brings a new Computer Weekly column and a chance for readers to win £5. In the spot previously filled by Interrupt, there now appears 1984 And All That. With the booming mass media coverage of the so-called "silicon chip revolution", there is increasing reference outside the technical Press to aspects of information technology. The new column aims to monitor this information cloudburst, highlighting some of the strange and quirky ways in which our industry is viewed by the outside world. page 2

WRITE ON

A lively debate on the role of marketing literature and the computer Press leads a lively page of readers' letters. page 4

AD FLASHES

Millions of travellers on London Transport have their journeys brightened by flashes of Kalchra and Virginia, showcasing vodka experiences and other delights revealed on over 300,000 advertising poster sites. Robin Webster, sales and marketing manager, reports on a new computer system to help LP plan their poster sites. page 12

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Downtime

by Chad

Red tape and type

ISN'T it nice how people out there in the big world think we computer people are supermen, and that our machines can do anything? I remember at the time of the moon landing, someone wrote to *London's Evening Standard* asking why these wonderful computers that had guided the men to the moon weren't being used to solve our earthbound problems of overpopulation, starvation and unemployment.

Are they more sophisticated now? Well, there are plenty of people who think computers are going to take over the world, or help Hitler come back from the dead. On a smaller scale, see this remark from an article on computers in *Red Tape* (great title!) the magazine of the Civil and Public Servants' Association: "One word processor, it is said, will replace ten typists, and it costs about £5,000."

How do we get it across to all the civil servants who are panicking that, with luck and a following wind, one word processor will replace one typist, and £5,000 is distinctly at the bargain end of the market? Mind you, later on in the article the author says that the Industrial Revolution took place in the 1870s, and that strikes a pretty severe blow to her credibility.

IBM please copy...

"IN the foreground, the sea. Behind Mount Fuji with its column of eternal snows. All around, the finest tea plantations in Japan. An ideal situation for a monastery, this is the setting chosen by Fujitsu for its new computer factory. Peace and solitude. Every necessary condition met to enable the 1,200 employees to produce harmoniously. Thus the 400 celibates, young girls in the main, need not concern themselves with a daily journey to work. The company provides cells - sorry, studios - within the womb of the factory.

"Chaperones and provisioners protect them from the outside world. And within this 'Nimble' complex, inaugurated in 1978, engineers are putting the final touches to what they describe as the biggest computer in the world." ... Jean-Michel Quatrepoint, Le Monde, on the manufacture of the first Fujitsu M-20H large-scale IBM compatible mainframe.

Aptitude tests

I WAS concerned to see your "Aptitude tests 'meaningless' report" (CW, December 12, 1978). The tenor of the article on *Unicomp* University's research was that all aptitude tests had been demonstrated to provide meaningless results, yet the last column suggests that only one test had been studied.

LETTERS TO THE EDITOR

TWO Computer Weekly readers have taken vehement exception to my article "Can you believe all you read in brochures?" (CW, November 23, 1978), writes Nicholas Enticknap.

I find the violence of the opinions expressed in both letters (see below) rather mystifying, as the facts they adduce in support of them are meagre, and are with one exception either complementary to my article or a duplication of points that I made.

However, the significant objection to both letters is that they have entirely missed the point. I was not writing a critique of the VAX. I was not attacking the VAX either. The fact that the report I was quoting related to the VAX was incidental by my argument. The subject I was discussing was, as the headline made clear, the validity of the descriptive language used in brochures.

Dr Maden's comments on the degree of compatibility be found between RSX-11M and VAX are therefore far from damaging to my article; in fact they provide good supporting evidence for the point that compatibility is not an absolute term and needs defining.

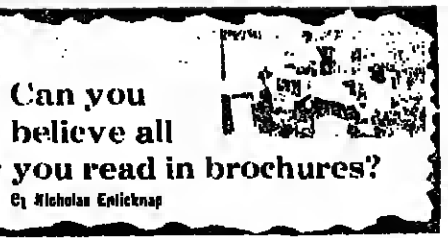
Mr Wisner is right on one point. The address-range of the VAX is 512 Mbytes. I apologise to anyone who was misled by this slip.

His other points, however, merely repeat parts of my article. I said, "For DEC a word is equal to 16 bits, whatever machine is being referred to". I said that on the VAX "32 bits is the maximum number that can be operated upon at any one time in parallel."

I concluded, "DEC is entitled to call the VAX a 32-bit machine," and elsewhere described the opinion that it was a 16-bit machine quite unequivocally as "wrong". How, after having made all these points so explicitly as I did, I can have left Mr Wisner with the contrary impression I completely fail to understand.

I hope that my article convinced at any rate the majority of my readers of two things: that manufacturers have a duty to be meticulous in the terms they use in their brochures, and that readers should be careful about what they understand from them. My article, and these responses to it, demonstrate clearly that readers can very easily misunderstand what they read.

It is impossible to stress too strongly the principle "caveat emptor". It should be borne in mind at every stage by all intending purchasers of every kind of computer equipment.



Can you believe all you read in brochures?
By Nicholas Enticknap

Computer Weekly, November 23, 1978

One obviously has to keep product brochures as simple as possible, especially when dealing with the journalistic fraternity, it would seem, and to call the VAX-11 anything but a 32-bit machine would be grossly misleading in my estimation.

Computer Weekly's accuracy and the literature of its correspondents leaves me in such doubts that I would immediately cancel my subscription - if I had one.

A. W. WISHER
Leighton Buzzard
Bedfordshire

D. MADEN
On-Itte Group Leader
Swiss Institute
for Nuclear Research

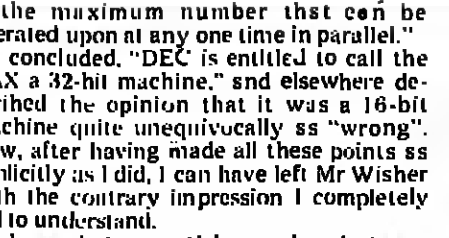
HOW amusing to read your article "Can you believe all you read in brochures?" (November 23, 1978), in which you warn would be readers of manufacturers' brochures of the possible ambiguities contained therein.

If your intent was to demonstrate the dangers inherent in all written work, I would suggest you have admirably demonstrated your point.

Repeatedly you state (three times in fact) that the address range of the Digital Equipment VAX-11/780 is 512K bytes. As I am sure you realise, and as your calculations lead one to anticipate, the correct figure is 512 Mbytes.

Further, you devote great column space to the definition of a "word". As far as I know Digital defines this as 16 bits, irrespective of the machine one is referring to.

It so happens that the VAX-11 can use two words (of 16 bits) concurrently to access data. Clearly, the VAX-11 is a true 32-bit architecture, contrary to the impression your article leaves.



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Putting the record straight

THE article by Martin Hudson in your December 7 issue refers to Honeywell's current computer range as being "long overdue for replacement" and to the company's profits as having "slipped badly in recent years".

Neither of these statements hears the most superficial inspection. Series 80 (the current range) was announced less than five years ago and has been progressively and comprehensively enhanced.

Profits in recent years, far from slipping, have consistently increased from \$67.1 million in 1974 to \$77.8 million in 1975, to \$113.1 million in 1976 and to \$145.1 million in 1977, with the first nine months of this year showing earnings of \$125.3 million compared with \$95.5 million in the same period last year.

The article questions the availability of sufficient resources at Honeywell to counter the challenge of replacing the Series 80 family, yet the company's spending on computer R & D this year exceeds \$200 million and will continue to exceed this figure in 1979.

As for Mr Hudson's other area of concern, database software, not only is this "excellent" (your contributor's own word) but it is also available - and excellent! - on smaller Series 80 systems for which database software was announced more than a year ago, a fact seemingly unknown to your contributor.

All the points I make here are public knowledge, and it seems quite extraordinary that Mr Hudson has failed to inform himself about them.

J. DUNCAN
Director
General Systems Division
Honeywell

YOUR editorial entitled *The Thunderer Silenced* (CW, December 7) fails in two respects to grasp the significance of the "New Technology" dispute.

First of all, it is naive to assume that the executives of the National Graphical Association, and the other unions involved, have failed to inform themselves of the precise nature of computer typesetting systems. Indeed, it appears that they are better informed than you. More detailed research for your article would have revealed that there is a significant "deskilling factor" involved. It would be difficult to argue otherwise, since proportional spacing, line filling, and many other functions accomplished manually on hot-metal systems are semi- or completely automatic on computerised systems.

Mini-makers 'burying heads in sand' on Series 1

MINICOMPUTER manufacturers are burying their heads in the sand rather than facing up to the threat of the Series 1. This is one of the main conclusions to be drawn from a new market survey, "IBM Series 1 in Europe", from Input.

The report investigates in detail the success of the Series 1 to date and the reasons for it. It examines the Series 1 in relation to IBM's overall plans, its impact on the minicomputer competition, and the opportunities it provides for systems houses and plug-compatible manufacturers.

Notwithstanding this, Input expects the Series 1 to make a big impact on the minicomputer market very soon, and to capture as much as 25 per cent of shipments at the peak of its sales curve in 1981.

Unrecognised by many minicomputer manufacturers, this impact has already begun with the loss of potential sales of systems for connection to large 370s.

The main factors that prompt users to choose Series 1 are identified by Input as IBM's reputation, the competitive price, and the modularity of the hardware. The early users are not yet convinced of the value of the product, but in general are confident that IBM will attend to their complaints in time.

The vast majority of systems are used for commercial and business applications. The most popular of these are inventory control, sales ledger and analysis, and invoicing.

IBM Series 1 in Europe, \$5,900. Available from Graham Kemp, Input, Empire House, 414, Oldwick High Road, London W4 5 1F. Telephone 011 993 5397.

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IBM aims to attract more shareholders

FOR the first time since the 1930s it should be possible to buy an IBM share for less than \$100 later this year. After failing for two years to fulfil the prediction of New York stock analyst Harry Edelson, of Drexel Burnham, that the computer giant would make its shares more marketable by making a share split (CW, January 13, 1977), IBM has finally taken the plunge and now proposes to offer holders four new shares in exchange for each share they presently hold. The date set for the split is as soon as possible after May 1st, provided that the move is approved at the annual meeting on April 30.

Announced in the week before Christmas, news of the split, coupled with a 10% boost in the quarterly dividend, was an immediate tonic to the share price, which rose \$12.75 to \$283. If this price is held until the split is made, the new shares would be valued at \$70.

The attraction of a lower share price is that smaller investors can afford to hold them. Several reasons for the move were given by New York stock analysts. Wider ownership would lead to more people supporting IBM in battles with the government. It was said more potential buyers for the shares would lead to a higher share price; and wider ownership would make the company better known and therefore a more viable contender in the consumer market for personal computers.

All were largely dismissed by chairman and chief executive Frank Cary.

"We are taking this action to bring our stock into a more competitive position in relation to the stocks of other quality companies," he told the *Wall Street Journal*.

Peerage for Brian Flowers

A LIFE peerage has been conferred on Professor Sir Brian Flowers, Rector of Imperial College, London, in the New Year Honours. Sir Brian, who received his knighthood in the 1969 Birthday Honours, was chairman of the Science Research Council from 1967 to 1973, but is perhaps best known in computer circles for the Flowers Report produced by the joint working group on computers for research, of which he was chairman in 1965. The report provided a basis upon which most university computing in the UK was established.

Other awards included MBEs for Geoffrey Bull, a project team leader with BP Oil, and Gordon Minkins, a seminar co-ordinator at NCR. He is mainly concerned with retail trade systems including point-of-sale applications.

NCR for K Mart

DISCOUNT store chain K Mart, which has about 1,400 retail stores coast-to-coast in the US has ordered over \$10 million worth of NCR point-of-sale equipment.



Rosamund is Salesman of the Month

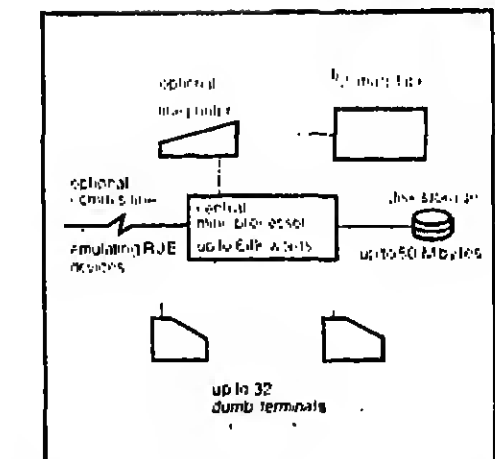
FOUR weeks after transferring to ICL's sales team, Rosamund Appleby achieved an £84,000 order and won the company's Southern region Salesman of the Month award for outstanding performance. Her customer was fire alarm and hotel audio system specialist Sound Diffusion at Hove, Sussex, which bought a System Ten 220 along with ICL's Rosamund with her own digital clock encapsulated in clear plastic.

Here, Tony Hadaway, Southern sales manager, presents Rosamund with her award and digital clock encapsulated in clear plastic.

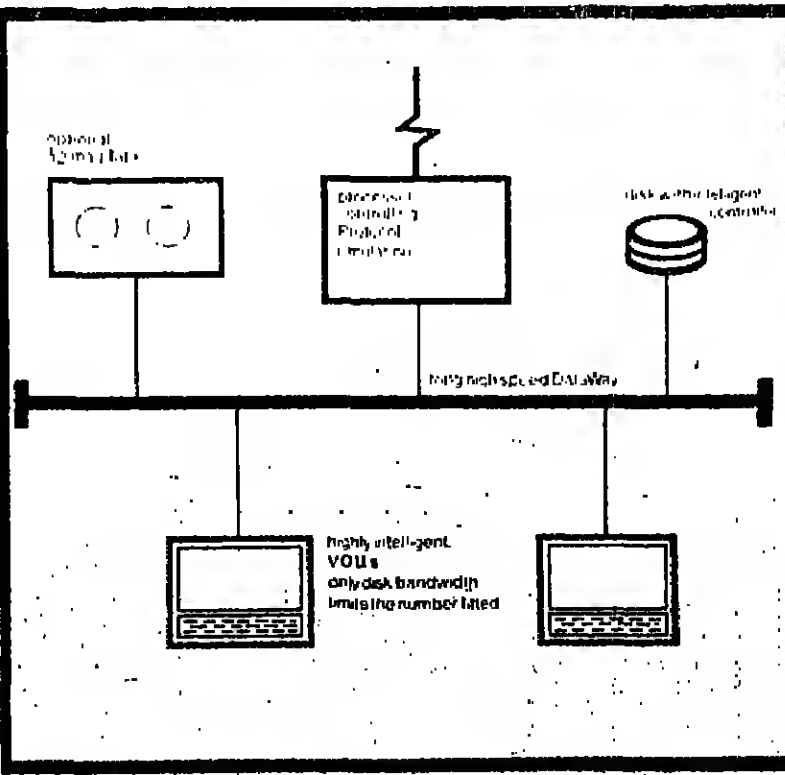
Before joining ICL two years ago to work as a systems executive advising customers and potential customers on systems implementation and applications, Rosamund had considerable experience as an analyst and operated her own data preparation bureau in Brighton.

CMC SOVEREIGN

First on the DataWay



A traditional key-to-disk system with every peripheral dependent on one central processor. From 1968-78, though, the most advanced method of bulk data entry.



CMC SOVEREIGN is a data entry system which uses the revolutionary CMC developed DataWay technique for linking a multiplicity of processors.

It retains key-to-disk's essential function of preparing data for mainframe at speeds exceeding 15,000 Ksh but encourages a multiplicity of other tasks to take place at the same time. And as there's a processor for every job there's no CPU competition!

CMC Data Preparation Distributed Processing Business Systems

Head Office and Manufacturing: Market House, Market Street, London EC1 2 7TA. Telephone 0445 51266.

RELATIONAL DATABASES

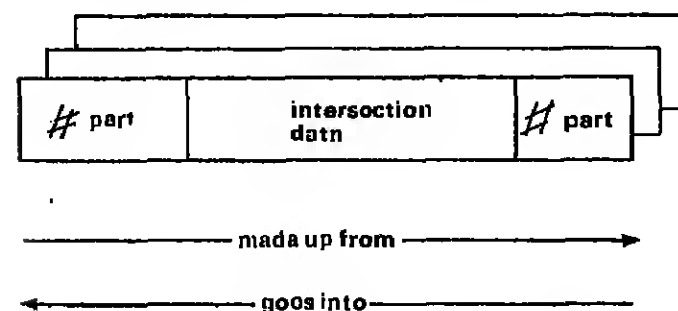
One link in the chain

THIS is the last article in the present series. Parts 8 and 9 examined complex sets of relationships in some detail. This week we will conclude with an examination of the bill-of-materials type of relationship and will propose a more general relationship diagram notation. I conclude with a brief look at the close connection between relational design and structured programming.

Bill-of-materials (Involutive) relationships: A data item can be directly related to itself. This is a characteristic of the bill-of-materials application where a part may be a component of several other parts, and it may itself be built up from several other parts; there is thus an n-to-n relationship between data item #part and itself. BOM structures can be represented on a relationship diagram by:



The FNF implementation is a file with two principal fields: a "made-up-from" #part and a "goes-into" #part. Extra fields can be added to contain intersection data particular to the relationship between one part and another; a typical extra field holds the quantity of one part used to build another part. The file would hold records of the following nature:



It is, however, difficult to draw a clear and unambiguous relationship diagram for a BOM structure which has, as it usually does in practice, intersection data.

General notation: The heavy reliance upon relationship diagrams makes it necessary to ensure that the diagrams themselves are unambiguous even for the most abstruse kinds of data relationship. One suspect is the symbol

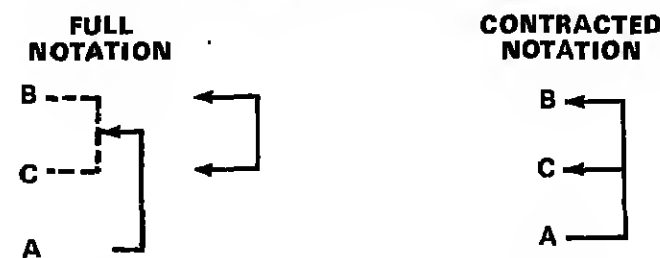


since it implies two separate concepts: an n-to-n relationship between A and C, and an n-to-1 relationship between the concatenation B, C and data item A.

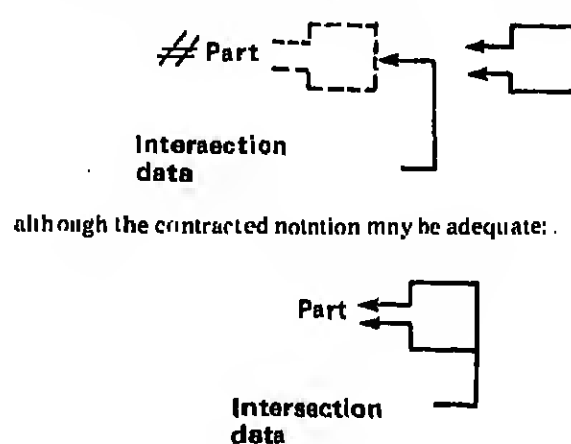
A more general notation exists which separates the concatenation of data items from the relationship between the concatenated items. The general symbol for concatenation is



with the obvious extension to more than two concatenated data items. Note that no arrow-heads appear. The following two diagrams are then equivalent:



The general relationship diagram or notation for a BOM structure with an intersection data item is:



although the contracted notation may be adequate:

The future: At the very beginning of this series the likely consequences of IBM's relational database stance were explored. But what of IMS, IBM's mainline database/data communication

Part 10
By Max
Stewart

This week Max Stewart concludes his 10-part tutorial series, using a bill-of-materials routine to demonstrate relationships. Stewart is divisional technical support manager at the Bathgate plant of Leyland Vehicles, the commercial vehicle section of BL.

package and probably the most complex and controversial system of its type extant?

Ted Codd, of IBM San Jose, demonstrated the potential of relational systems as long ago as 1970, not long after IMS became available, and in spite of IBM's cast-iron commitment to IMS there is a strong body of opinion both within and without IBM that the future lies in that direction. But IMS has a certain mystique; anyone with a feel for "bidirectional physical twin pointers" and "virtual logical children" has the IMS equivalent of a Masonic handshake. Nevertheless, even some of its fondest adherents feel that IMS has "grewed like Topsy" and is a little dated. And its critics...

Conclusion: Readers who have borne with me thus far and have still retained some enthusiasm may be forgiven for thinking that relational design is claimed to be a complete systems methodology. It isn't. It is one link in a chain:

● Decide on report or screen formats — analysis.

● Decide which source data items are needed (including those supplied interactively) — analysis.

● Create file or database structures with these data items — relational design.

● Decide how to process input files/screens to produce reports, output screens or files — structured design à la Jackson.

Structured design and relational design are complementary, fit neatly together and have the same objective: to produce clean designs based on data relationships rather than upon some arbitrary and machine-orientated idea of how we should process these data. Mike Jackson has said when writing about structured program design: "The computer system sees the world through the medium of its data structures... If, therefore, we give our program the same structure as the data it processes we can expect that we will have no difficulty in making an intelligible and correct program."

To which we can add: "... and if we can ensure that these data structures mirror the real world, we are doubly blessed".

* Principles of Program Design, Academic Press (1975)

GILB'S MYTHODOLOGY
Learning from experience

WE ARE all weighted down with an unfortunate tradition. Within the professional memory of most of the senior practitioners of data processing, the hardware and software systems we worked with were so simple that we were able to understand them and to guess reasonably well at most of their technical and economic characteristics, by learning about their inner workings.

I think the point where I began to realise that such methods were inappropriate was with the announcement of IBM's 360 series, the 360 Operating System and, not least, PL/I. I still made desperate efforts to understand the inner workings of the systems, since I apparently had a responsibility to do so, but gradually I began to understand that I really didn't and couldn't understand what the essential attributes of these systems were by using this method.

My embarrassment was reduced by the growing recognition that nobody else at IBM, particularly the people who produced the software, seemed to understand the consequences of what they had patched together.

As a consequence of this growing recognition, I began to develop and practise methods of increasing our ability to understand complex hardware/software systems. Almost all of my professional associates, students and clients

have seemed to feel the same need for better tools, and have made use of them and helped me develop them for the past 10 years. I have shared some of these tools with readers of this column.

These methods you may remember as MECCA (Multi Element Component Comparison and Analysis), Formal Project Goal setting (Metrics Matrix), and Function/Attribute/Component Table.

Several of my pieces have dealt with more specialised details of this perception process, such as portability measurement.

There is one common element to all of these methods. It is that we no longer ask about the internal structure of a method as a major tool to understanding it. We ask first for experience data about the expected attributes of the method, the hardware or the software.

The systems we are faced with are all so complex that only experience data gives us a reasonably trustworthy view of the cumulative effect of all the details inside these black boxes.

The attribute questions we ask are related primarily to the primary and critical goals we ourselves are interested in controlling. But typically we are looking at attributes such as costs, learning difficulty, maintenance ease, failure rates, performance, implementation ease and similar qualities, which if uncontrolled can spell disaster for our projects.

This is, of course, just good common sense, and is applied to many complex disciplines, including, to some degree, our own. But it is still difficult to pick up a professional OP publication and find that almost all articles, papers and discussions are still not approaching this issue directly through experience data. They are still describing the logical structure alternatives of distributed databases, and the latest variations on structured logic. They are not posing hard questions such as measurable effects on reliability, maintainability, portability and costs.

Naturally these questions are more difficult to answer. But the answer may be critical to the credibility of our profession. At the moment I believe that I can safely state that we

have already lost our credibility in the eyes of others.

There is hope for each of us, if we get into the habit of asking hard nosed questions of the sellers of new ideas surrounding us. Tell them that before they launch into their glorious detail about the insides of the black box, you want to know some facts, quantitatively, about the multi-dimensional attributes of their magic.

If these are interesting enough you won't have to look inside. If they are not interesting enough, you won't want to look inside.

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SOFTWARE FILE

Transportability is key
aim for Fortran

PROVISION in the language standard for the transportability of Fortran programs is one of the major goals set itself by the ANSI X3J3 committee which is working on the next standard, due to appear in 1982.

It was one of several goals of the current work identified at the British Computer Society's Fortran Forum 78 by Martin Greenfield, vice-chairman of X3J3 since 1962.

Transportability, he said, was one way of meeting the requirement for greater program portability. What was envisaged was that programs should adapt to the characteristics of the host processor; what the standard would have to do was define processor characteristics in a portable way.

A definition of the processor environment would be likely to take the form of a table at the start of the program. The form chosen could represent a standardisation of similar methods already used by those implementing transportable software, such as the Numerical Algorithm Group.

One major problem likely to be addressed is that of REAL. Fortran 77 here made no advance over the IBM standard, leaving unchanged the definition of a Fortran REAL as an "approximation" to a real number.

It was noted by one of the speakers at the Forum that the failure of the standard to specify a degree of approximation in theory left the door open for extreme interpretations — for example, a fraction might be truncated to an integer without violating the standard.

A speaker from Sweden, I.

Dahlstrand of Lund University, later vividly illustrated the problem of program portability and processor word-size with an example of the same program giving four different results.

The code
K=5000000
L=K*K
WRITE L

yielded, he said, COMPILE TIME ERROR on one 24-bit machine, RUNTIME ERROR on a 32-bit machine, an incorrect result (through truncation) on some machines, and — on a few machines — the right result.

This, he suggested, was unacceptable in an age when com-

puter systems were used for "building bridges, and making moon shots. If, as has been suggested, Fortran will be with us for another 100 or 150 years, this degree of machine dependence cannot go on."

Several incidents during the day highlighted the often cited fact that most users have a poor knowledge of what is in the standard.

Describing a survey of UK opinion on what should appear in Fortran 82, David Muxworthy, of the Edinburgh Regional Computing Centre, observed that many responses suggested features already in Fortran 77 while some requested features

that had already been present in the 1966 standard.

A related questionnaire, he said, had shown that portability, simplicity, and ease of use were generally seen as the chief merits of Fortran. A considerable body of users felt therefore that extensions were more likely to be damaging than beneficial.

Among those who favoured further development, proposals for new control structures, looping for example, were by far the most popular.

Least wanted were facilities for recursions, labels as a new data type, and a change which would make blanks significant in program source.

Machine-independent front
end makes RTL/2 portable

FOLLOWING the announcement of a "portable" Fortran 77 compiler (Software File, November 30, 1978), HPAC has revealed that it is close to completing the development of a similar RTL/2 processor.

Partly backed by Computer Automation, the software will be available first on CA's latest processors — the Naked Mini 4 and its code-compatible packaged version the Alpha LSI-4.

HPAC will subsequently be able to supply compilers for a variety of processors, including the Data General Nova and Interdata 16-bit and 32-bit machines, as well as the earlier CA Naked Mini 2 and Alpha LSI-2 systems.

This is because the RTL/2 front-end — like all HPAC compilers — is written in BCPL and generates a machine-independent intermediate code. Likewise, the same code is produced regardless of the high-level language being processed, so that only one back-end need be written per machine.

HPAC's managing director described this approach as "orthogonal design: the front-ends are portable across machines, and the back-ends are portable across languages."

One of the effects of this architecture is that languages can be freely interfaced. As with HPAC's Fortran, RTL/2 programs will be able to call Coral subroutines.

Provisionally scheduled for release next April, the RTL/2 compiler represents a significant departure for the language in that it will be the first not to use the "official" front-end.

Originally written and still owned by ICL this has been the "root" of the large range of

compilers developed by SPL for the language. More recently, it has also been licensed to Software Sciences, which is developing software for the Data General Nova and Texas Instruments TMS320C4 family.

The existence of a common front-end has so far made a major contribution to the rapid development of a "frozen" standard for the language. An important selling point for RTL/2 this is to be backed up early this year by the publication of a British Standard specification.

HPAC's implementation will conform meticulously to the existing definition of the language, and the company has undertaken not to include any enhancements, apart from a complete ISO-7 character set, without the agreement of the "appropriate parties".

It believes, however, that computer languages, like natural languages, must grow if they are not to die. It has therefore designed its compiler to allow for enhancements, should they be agreed.

While RTL/2 is probably most widely used on DEC PDP-11 systems, SPL has developed compilers for most widely used minicomputers. In particular, it has already supplied users with versions for Interdata 32-bit machines (Software File, April 27, 1978) and CA's LSI-2 (Software File, November 17, 1977).

Commenting on the fact that SPL had not produced a version

for the LSI-4, a spokesman pointed to a number of more urgent implementations currently under way, including compilers for the DEC VAX-11/780, the IBM Series 1, the Hewlett-Packard 1000, the DEC system 10, as well as "portable" microprocessor RTL/2 (CW, September 14, 1978).

EDITED BY PETER HEWITT



On the board

Neil Pollock, MBE, a former director of management services for British Steel, has joined the board of F International. A member of the National Committee on Computer Networks, Pollock was responsible while at BSC for a major strategic computer communications development, and directed a special staff totalling over 250. He has also had considerable experience of organisational studies. Prior to his appointment as a director, he has been working in a consultative role with F International at board level.

PROGRAMMER NOTES

A CORRESPONDENT who pointed out some common misconceptions about the virtues of Basic (Letters, November 16, 1978) has written again to contest a claimed counter-example.

J. A. T. Maddison, of Thames Polytechnic, writes: "The example used in my earlier letter to show how Basic requires the use of control logic was chosen to be self-evidently clear in its effect. However, this example is rarely open, and my example could easily be altered to close it."

80 IF X = 0 THEN 100
80 LET X = -X (or LET X = ABS(X))
85 LET N = N + 1
100

"In standard Basic we would have no alternative but to replace the mental concept 'if x is negative' by a test for X > 0, or zero. "More seriously, there has been no challenge to my three points. (i) Statements that Basic has an inherent advantage over other languages in being interpreted are based on ignorance of requirements for interpretation and compilation. (ii) Basic conceals the task of programming by forcing one to enter the logic of the algorithm. (iii) Basic, as a language, is no more interactive than Fortran, Cobol or Algol."

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A White House report on technology transfer was presented to Congress last year (CW, September 14). HESH WIENER presents a condensation of the report, with particular emphasis on its implications for national security.

The most interesting technologies discussed in the White House report on technology transfer sent to the US Congress (Guest Computerview, September 14), are those which have significant national security implications rather than those which deal with agriculture, health, or education.

Technology transfer can be defined as the act of conveying know-how from one country to another. The items may involve the export of technical data, equipment, and processes.

The effectiveness of technology transfer depends not only on what is transferred, and how, but also on the capacity of the receiving country to absorb it and put it to work.

The term "technology transfer" is also frequently employed in a broader sense to refer to the export of products (end-items) embodying particular technologies.

Given the extent and complexity of the controls which

White House view of technology transfer

have been established and the need for effort to improve their effectiveness, an ad hoc National Security Council (NSC) Technology Transfer Group has been established to co-ordinate implementation of planned improvements in the export control system. The group will include representatives of the major agencies involved.

There are four general ways in which civil technology transfers (that is, transfers for civil purposes) might contribute to the military potential of the receiving country.

Firstly, where the technology is embodied in a product which has potential military application, it is possible that the product might be diverted from an intended civil use to some military use.

Secondly, know-how might be transferred to produce products, such as electronic components, for the civil sector of another

country. These products might in turn be applied to military as well as civil uses.

Thirdly, know-how supplied for civil purposes might be diffused from the civil sector to the military.

Finally, it is sometimes argued that if imported technology has a resource-releasing effect (through more efficient use of resources), resources released from the civil sector might be redeployed in support of military programmes.

Certainly, in the US, much technology is in the public domain, and there is very little the government can do (even if it wished to) about controlling the flow of information, through technical and trade journals, for example. In many cases, however, technology in the public domain is not the most advanced technology, except in such fields as agriculture, health, education, and con-

struction. Much technology of potential military interest is proprietary. The concern controlling the technology may, therefore, have a stake in protecting it.

Government control is not, therefore, synonymous with government ownership. In addition to having the authority to control exports, the government can impose security classification.

In the case of Nato, sharing advanced weapons technology strengthens the common defence. One of the most common forms of the transfer of weapons-related technology among allies is the licensed manufacture or co-production of advanced weapons systems and components. Data transfers and co-operative research and development are also used.

In the case of both weapons-related and dual-use technologies, it should not be assumed

that trying to retain specific technologies in the US would ensure technological superiority. Such effort alone might be counterproductive.

The temptation to rely on existing technology, coupled with decreased government research and development funding, might lead to a slowing of effort directed toward the research, development, and continuing technological innovation that are essential to continued US technological superiority. It is under such circumstances (rather than as a result of the transfer of technology abroad) that loss of US technological superiority might occur.

There is very little hard evidence that technical data of US origin has leaked to the East through "third world" countries. Controls are imposed on retransfers or re-exports. Most cases of diversion of US know-how to the East involve third industries in one way or another. However, the number of proven cases of such diversions is quite limited. Other industrialised Nato countries and Japan co-operate with the US in CoCom to co-ordinate controls on the export of strategic products and technologies.

Non-aligned Western countries of course do not participate in CoCom. For their own reasons, however, they too control certain exports.

The Soviet Union has been willing to sell sophisticated weapons to almost any developing country, has accepted somewhat lower prices than those for comparable Western equipment, and has been able to make fast deliveries.

The US and the Soviet Union have initiated talks concerning restraints on conventional arms transfers.

The US recognises the proliferation dangers inherent in the spread of certain sensitive technologies (uranium enrichment, reprocessing, and heavy water production) and has maintained a policy of not authorising the export of such facilities and of urging other supplier nations to exercise similar restraints.

Intergovernmental programmes of scientific and technical co-operation are not yet carried on by the US and the People's Republic of China. A small number of government-facilitated exchanges takes place each year involving a wide range of scientific, technical, and social fields. These exchanges are of short duration and are primarily directed toward basic research. They are not considered to have any significant impact on China's military potential.

The US and Soviet Union are currently engaged in co-operative scientific and technical efforts under 11 bilateral agreements. The activities under those agreements generally involve exchange of information and experience and basic — and sometimes applied — research. Although the Soviets in some areas have sought activities more directly related to production technology, they have accepted US limitations, and sometimes insisted themselves, on more basic research efforts.

The controls exercised by the US and other members of CoCom are designed to withhold militarily significant uses; the review process necessarily seeks to determine whether legitimate civil uses can be accommodated without significant military risks.

Much discussion of export control issues has centred around exports of computers, for which there are many bona

fide civil uses. Computers and computer peripherals account for more than half the total of CoCom-approved exceptions.

Where such exceptions are made, however, it is because the circumstances or conditions of the export make clear that the exports would not have adverse military implications.

Close and effective cooperation among the US and other major nuclear supplier states has been developed in the Nuclear Suppliers Group, whose major effort thus far has been development of guidelines for the transfer of nuclear technology and materials.

In general, the US offers only limited incentives for the transfer of technology abroad. In the case of the Export/Import Bank, most of the exports supported by the bank are capital goods and thus to a degree entail the transfer of technology.

However, it is not appropriate to characterise the bank's programs as "incentives" to transfer technology abroad. Rather, the bank's activities are



Center... Congress is asked, "Why should our exporters be denied profitable sales opportunities not denied to our competitors in other countries?"

relevant to the question of who will export the capital goods in question (the US or a competing industrialised country). A recent study by the Treasury Department indicates that in the bank's direct loan programme, in 64% of the cases, the export would not have taken place without the loan. It is reasonable to assume that in a number of these cases, the business might well have gone to another country.

Existing legislation and regulations provide an adequate basis for the identification of strategic technology to ensure that national security implications are properly considered.

This legislative authority has been translated into effective regulations which are reviewed and modified periodically, particularly as they relate to adding and deleting specific items from controls.

In the case of dual-use items and technologies with extensive civil applications, controls may be desirable for items and technologies having particularly significant military applications. However, the case for unilateral national action is weak. Most technology is so widely diffused in the industrialised countries that unilateral controls would be ineffective.

Exports of items for apparent civil uses are considered part of normal trade, with few legal, political, and military significance than exports of arms. In the absence of international agreement on export controls, the question is raised as to why our exporters should be denied profitable sales opportunities not denied to their competitors in other countries.

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Intel single chip analogue micro

ON the way from Intel is a single-chip microcomputer incorporating analogue-to-digital and digital-to-analogue converters. Designated the 8020, the chip is to be previewed at the International Solid State Circuits conference in Philadelphia next month, and has already been hailed as the 1979 Product of the Year by New York stock analyst Benjamin Rosen of Morgan Stanley.

Rosen sees wide applications for the chip in consumer electronics, control systems, measurement and communications.

ICL plans

SEEKING funding under one area or more of the Department of Industry's microelectronics support programme, ICL has appointed an executive to put together formal proposals which will be presented soon to the Department for consideration.

United drops out of leasing

● From front page

leases had reached the break point rather than make claims on its Lloyds underwriters (CW, November 23, 1978).

ICL said that it would not claim unless the reduction in the residual value of a machine compared with its original assigned residual value was "catastrophic."

The total loss involved on all

Post Office pay dispute

● From front page

strike action in January if the claim was not met. But the SCPS executive committee intervened and asked the men to give the PO until February.

A meeting of the PO board has been set for January 23 to discuss the claim.

"The problem is that although no action has been taken yet, it is uncertain how long it will remain that way," said the

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London Transport has more than a quarter of a million poster sites, some of them on buses and trains whose routes are prone to change at short notice. The Media system

described here will help with the mammoth task of keeping track of them, and will enable sales staff to market the more popular sites at higher rates.

Media keeps London Transport poster

With about 300,000 poster sites around London on its buses, trams and underground stations, London Transport has a very long list in terms of advertising.

Long enough at least to make us familiar with the idea that by drinking a particular vodka "anything could happen", or that to go places we should "fly the lube".

But it's not easy to keep track of over a quarter of a million pieces of paper. And this is where Media, a computer system under development at London Transport's data processing centre in Newman Street, comes in.

The system has been designed so that a far more detailed and accessible picture of the posters fixed to vehicles or station walls can be built up. It is not impossible to "lose" a poster within the maze-like tunnels of the underground due to the sheer number of changes involved.

At present, London Transport has a team of sales staff selling space, either in small "one off" quantities, or in blocks as part of big campaigns. There are three departments, each catering separately for buses, trams and the underground stations.

The job is demanding and, as Fred Iles, Media project manager at London Transport, said, "Salesmen have been particularly happy to get 50% of the area they wanted for a customer, there being no guarantee that specific sites could be allocated."

This has led to a waste of resources, as advertisers sometimes wish to have posters pasted up on the more heavily used stations such as Oxford Street where large numbers of shoppers and tourists pass through.

It is likely now that Media can help market such "high exposure" sites at more lucrative rates.

The reason for the lack of control is that the manual filing system being used by sales staff at L.T.'s Lindsay House offices cannot now cope with all the variable types of data involved. Among these is the fact that there are many types of buses.

With a fleet of 6,000 buses, the data to be held is very detailed and problems arise if buses on one route are moved to another, taking their original posters with them.

"The main complaints from advertisers has been that they did not get market coverage information and that they were not given precise information on where the posters had been placed," said Iles.

To combat this problem, we started thinking about another system, and in 1975 had some consultations with an outside

software firm. Its recommendation was that in order to get a "more orderly" house and far better administrative control over poster sales a computer system was required.

Work then began in earnest on developing Media, which runs under Maximop on L.T.'s own ICL 1904S at Newman Street; the development team being Fred Iles and David Trethewey, a senior analyst at L.T.

The only problem about using such an unconventional method for what has traditionally been a labour intensive job, is that you cannot really gauge how suc-

cessful it will be until it is operational.

"To justify such a project we can only say that we expect to get tangible savings," explained Iles, "but as yet we can't quantify this. Certainly, there are likely to be staff savings — not redundancies, but redeployment of staff within London Transport."

Operator of Media will be simple. All poster sites will be numbered or coded in some unique way so that when sales are made, information relating to each sale is fed into the system via three online VDUs.

This enables an up-to-date

record of availability and allocation of spaces and posters to be kept. Once everything is checked on new sales, instructions telling poster staff where to paste up the adverts are produced on pre-printed forms.

This month, the first phase of Media's implementation will take place. This will be the issuing of fixing instructions for buses only and it will be controlled by a master file of all the various bus poster spaces on the whole L.T. fleet, plus any unique spaces that may arise.

In two months' time, the same application for trams will be introduced and in August, the full

procedure of availability, allocation and fixing instructions for trams, buses and stations will be completed. Processing in these cases will be done in batch mode.

With the system it will be easier for sales staff to see when posters come to the end of their campaign life and to allocate such areas to new posters, thus gaining more revenue.

The same three VDUs used for input of data will also be used for online checks and they will eventually be able to access about 20 Mbytes of data.

And while Media has yet to prove its worth, there are dis-

cussions taking place as to whether the system might be integrated with others already running.

"One idea is that we could link Media with our Bus Accounting and Revenue Control and Rail Accounting and Revenue Control systems to provide us with better statistics on the volume of passengers at each garage or station. This will also help us to offer advertisers further information as to what exposure their adverts will get," said Iles.

—ROBIN WEBSTER



With its Media system, London Transport will soon be able to provide a much more flexible service to advertisers. Due to come into operation in August, it has taken about two years and £50,000 to develop. Our picture shows Fred Iles (left) Media project manager, and David Trethewey, a senior systems analyst.

Practical advice for designers of automated office systems

At a conference on office automation, Professor Howard Lee Morgan of the University of Pennsylvania's Wharton School, described a system designed to support the work of the School's academic staff, and gave would-be designers of automated office systems some practical advice.

opportunities that are now open to them.

Two particular facets of the architectural approach were highlighted by Morgan. First, the name of the game is automation, and not mechanisation, which is the state of the art in most installations today.

The object is not merely the more efficient production of paper. Secondly, these systems should be very people-oriented.

Such an opportunity arose recently at the Information Studies Ltd conference "Towards the automated office." Among the speakers with practical experience, one of the most interesting was Professor Howard Lee Morgan of the University of Pennsylvania's Wharton School, who described the project which has been running there since 1974.

The Wharton School project was designed not merely as a research exercise, but as a practical tool to support the work of the academic staff. This involves the production of papers for learned journals and also the control of research projects.

Professor Morgan travels widely, but by carrying a terminal about with him is able to control the work of his 15 research workers plus 25 secretarial and other support staff from wherever he is.

Morgan described the design approach as architectural, implying a concern about the context within which the system is embedded and about what is put inside it. In this context he noted that the major challenge presented by office automation is organisational — it lies in getting organisations to accept the

possibilities of presentation it provides. One aspect of this is that you can split up a screen by giving various portions of it different background colours.

The screen should also be split at the system level, as is done on the IBM 8100 and Hewlett-Packard HP300. As Morgan says, "You normally have more than one piece of paper on your desk at any one time."

Another point is that you always need more addressable memory than you think. Each generation of computers has repeated the same error of underestimating the size of main memory required. Some secondary storage too is required, because the manager will want access to some information which he doesn't want other system users to see.

On the software side, the basic tools developed for the system include a document preparation editor, an electronic mail facility, a calendar maintenance system, a hierarchical filing system, a task manager and a database maintenance system. A general observation made by Morgan was that these systems must be "friendly."

For example, a message reading "Illegal Entry" is definitely not friendly. System users who are not skilled typists

are likely to make errors such as misspellings, and the system would be designed to cater for this, in the same way that a human being would. There should be extensive help procedures, and powerful "menus" describing the alternative courses of action available.

The electronic mail facility enables users to send messages either to named individuals or to job positions; and of course it doesn't matter whether the recipient is in his office at that time or not. When he does "open his mail," he can with one keystroke set up the appropriate action mode. He can decide to reply, and the system is set up so that this is as easy as telling his secretary "write to me and so on and tell him I agree to his proposal."

In the same way as she would then formulate, type and transmit the reply without further instruction, so can the system eliminate many of the overheads. An instruction to file requires similarly little effort to effect the desired action.

An important point about electronic mail, said Morgan, was to break users into the system gently. People take some time to get used to the idea of going to the terminal to see what's come in. In the Wharton School, new users are given a build-up of dummy messages, lasting about a month.

Although the Wharton system is still being actively developed, it is a practical system which is being used by 2,000 different people, about 100 of whom use it every day. Morgan stresses that it is essentially different from a data processing system, in that it

automates a lot of different tasks each of which will be performed fairly rarely by any one individual.

There is thus "a critical mass of functionality"; it is only when a lot of tasks are on the system and a lot of users are hooked into it that will begin to pay.

Morgan drew attention to two sets of external considerations. The first was privacy; legislation may well affect the kind of personal files that are kept on such systems (and indeed in Sweden it already does). There is also a personal aspect: how detailed do we want other people's knowledge of our own activities to be?

The second concern is sociological. Where will we be working in the future? Automated office systems allow people to work wherever they wish to or find it best to provide their terminal within reach. Morgan felt however that the vast majority will continue to work in offices for a long time yet.

In general, Morgan felt there were four steps on the way to automated office systems. First, word processing (but, he stressed, make sure these systems have communications facilities). Secondly, personal mail systems. Thirdly, personal computers: not hobbyist playthings, but computers controlled by single individuals, as electronic calculators are today.

The final step is interconnecting them all.

—NICHOLAS ENTICKNAP

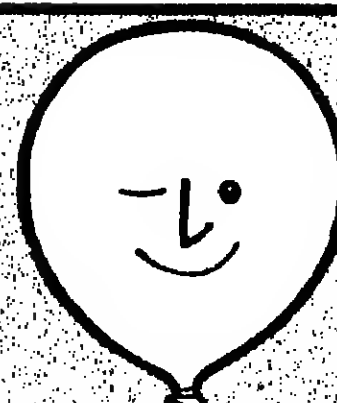
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Software Engineer IBM EXPERIENCE

Middlesex/West London

The Data Communications Division of a £3 Billion Corporation operates a small and highly successful company employing about 80 people World Wide. The bulk of the day-to-day sales and support is handled by about 37 distributor companies in over 40 countries.

One of the main functions at this nerve centre is the on-going now product evaluation. The continual process of introducing new product lines to the existing Hardware and Software range stimulates work content and job satisfaction for the people involved.

Plans for 1979 involve the introduction of many new products which will have to be evaluated, tested and supported through distributors. An important new product range incorporates a direct channel interface into IBM. Accordingly for this appointment we need candidates with experience of IBM or IBM compatible equipment. Specifically, we would prefer people with experience of IBM software including access methods 1-5. Software and interfaces with minicomputer environments, although people with similar experience in other mainframes would be considered.

This appointment calls for a highly qualified individual who has the strength and ability to evaluate market trends, organise training facilities and to take responsibility for his own specialised area. Long-term opportunities exist for movement and growth within this light and organisation.

CW/1/10

Software Programmer

Reading

£5000-£9500

A Major International Software House requires programmers with a minimum of two years' ASSEMBLER level programming on any manufacturer's equipment and who are familiar with the techniques of writing software.

This is your chance to join a team engaged in the design and coding of major communications systems software for ICL's 2900 series under the VME supervisors.

You will be paid a competitive salary, up to the top of the indicated range if you can also demonstrate specialist knowledge in one or more of the following:

- SSL Coding
- S3 Coding
- Language Design
- Compiler Design
- TP Monitors
- VME-1
- VME-2

Natural ability and professionalism are more important than experience as full training will be given where necessary.

CW/1/13

Systems Consultants New Product Range

Continental Europe

Up to £15000

Our client is one of the world's pre-eminent systems software companies. In co-operation with several of Europe's leading computer manufacturers they are working in the planning and design of new systems based on both mainframe and minicomputers.

For one major manufacturer they are setting up a central software planning department whose task is to define and design a range of systems software capable of sustaining a new range of minicomputer products in a market sector oriented towards distributed systems, networks and on-line interactive commercial applications.

Additional Senior Consultants are required (minimum ten years' experience) with outstanding knowledge in the areas of real-time systems, operating systems and data base design.

CW/1/15

Programmers/ Designers MINI-MICROS

Reading

£4500-£6250

One of the largest independent Systems Houses who have offices throughout the United Kingdom and Western Europe, have an urgent need for PROGRAMMERS/DESIGNERS for their READING office.

Their clients range from computer manufacturers, nationalised industries, process control equipment manufacturers, through to small local businesses. With such a wide client base they are able to offer varied experience and careers leading to roles such as Project Management, Management Consultancy, Systems Analysis and Design.

The range of minis and micros on which they work is only exceeded by the variety of backgrounds and experience they are prepared to consider applicants from. Experience on the following hardware would be of special interest: 2903, 8800, Datapoint 2200 & 5500, PDP-8, 10 and 11, 8800s, Zilog, Intel, Motorola and Tuxia micros.

Openings exist in their Small Business Systems, Industrial and Process Control and Basic Software Groups. Applicants should have at least 18 months' experience, and be interested in progressing into other areas of computing.

CW/1/11

Opportunities in Europe for 1979

Attractive Salaries:

- | | |
|------------------------------------|-----------------|
| 1. CAD/CAM — Mechanical Eng. | HOLLAND |
| 2. Technical Analyst/Mini Software | HOLLAND |
| 3. Siemens 330 Software | GERMANY |
| 4. IMS Systems Programmers | GERMANY |
| 5. Production Control Analyst | GERMANY |
| 6. 32-Bit Machine Software | SWITZERLAND |
| 7. IBM Systems Engineer | FRANCE |
| 8. Network Designer Mainframe/Mini | SOUTHERN EUROPE |
| 9. Real-time Consultants | HOLLAND |

Candidates interested in a move to the Continent with the above or similar experience, should contact us to discuss those opportunities.

CW/1/14

Sprechen-Sei Deutsch?

Minis/Mainframes up to £17500

One of the most prestigious software companies in Europe is currently expanding their German operations in Central Germany. Their business is based on a wide range of projects currently being developed on both Minis and Mainframes.

Due to this planned expansion, they want to meet several computer professionals who are competent in German. Technical background can be spread but current priorities call for experience of system 370, 34, Nixdorf, POP-11, Nova, Siemens 330 and the internals of IBM operation systems.

While our client can accommodate people seeking employment for a year or so, they definitely want candidates with medium to long ideas about settling in Germany and building a career within the firm. Although they require specialists in the above skills they are also very interested in recruiting Junior people with circa two years' experience to develop their careers.

CW/1/12

Analysts & Programmers

London to £7000 + Car Scheme

An exciting opportunity has developed for ambitious Analysts and Programmers to join a medium size, expanding computer company involved in automotive and finance industries.

Our client's computer operations are based on NCR CENTURY 75, which will be upgraded in April, 1979, to a 75-70. Development is in progress on an interactive minicomputer system using such response equipment on a nationwide basis.

They would like to hire from Analysts with a Programming background and have had some previous systems experience. It is unlikely you will have had less than five years in the D.P. industry. Also we would like to hear from N.C.R. trained Programmers who have had between 1-5 years' experience.

Continual company growth based on the development of external customers' systems, guarantees excellent prospects for suitable employees who are prepared to work hard.

CW/1/15

Distribution Designers

Multi-million Pound Development
Southern Europe £8000-£12000

Our client is an international systems company engaged in specifying and designing a nationwide computing network for a distribution organization. The end result will comprise a wide range of on-line and batch applications operating on a network of up to fifty mainframes and minicomputers.

They require analyst/designers with experience in any of the following:

- on-line minicomputer systems
- applications for order entry and inventory control
- communications
- hardware/software integration

The project offers the opportunity for short or long-term assignments based in a capital city of Southern Europe. Remuneration, benefits and allowances are commensurate with the scope and importance of the project.

CW/1/16

SYSTEMS CONSULTANTS — SYSTEMS ENGINEERS CHOOSE GERMANY

SALARIES TO DM 90,000

Are you looking for?:

- A new challenge in sales support.
- Real career development.
- Exciting new products.
- International travel.
- High earnings and large company benefits.
- Extensive training (including German language).

We are looking for experienced systems people to spearhead our attack on the medium-to-large systems market with our revolutionary new products.

You will probably have some three years' experience with medium/large IBM, ICL, Univac, Honeywell Systems. A good knowledge of Assembler and Cobol, DOS/VS — VM/370 or equivalent. A knowledge of PL/1 or RPG-II would be an advantage.

After formal product training you may choose to work in MUNICH-FRANKFURT-DUSSELDORF or HAMBURG and a full German language course will be provided.

ACTION — Phone or write quoting reference DS-2 for an informed discussion and an interview in London.



INSIGHT MARKETING & PERSONNEL
CONSULTANTS LTD.
72-75 MARYLEBONE HIGH STREET
LONDON W1M 4AJ Tel: 486 5644



Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212 Telex 27950
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)

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CONTRACT DIVISION

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IBM
SYSTEMS DESIGNER OS PL/1 COBOL 1800 PLAN. MIDLANDS c. £250
ANALYST/DESIGNER IMS. NORTH WEST c. £250
CICS PL/1 DL/1 CONSULTANT. MIDLANDS c. £250
IMS PL/1 PROGRAMMER. MIDLANDS c. £230
IMB COBOL PROGRAMMERS. MIDLANDS c. £230
COBOL PROGRAMMERS. MIDLANDS, NORTHWEST c. £220
ICL
2903 ANALYST/PROGRAMMER. NORTH WEST c. £230
2803 PROGRAMMERS. NORTH c. £220
1900 COBOL GII/III PROGRAMMER. MIDLANDS, NORTH WEST c. £215
2960/70 VMEB/MEK COBOL PROGRAMMERS. NORTH c. £220
2960/70 VMEB/MEK FORTRAN PROGRAMMERS. NORTHWEST c. £220
OTHERS
PDP11 TECHNICAL SPECIALISTS. MIDLANDS c. £250
SYSTEMS DESIGNER SRX11M RTL2 BASIC + 2. MIDLANDS c. £250
PDP11 BASIC + 2 PROGRAMMERS. MIDLANDS c. £230
HONEYWELL COBOL PROGRAMMERS. NORTH MIDLANDS, SCOTLAND c. £220
IDB/TDS SOFTWARE SPECIALIST. NORTHWEST c. £250
UNIVAC COBOL PROGRAMMERS. MIDLANDS, NORTH WEST c. £220

Ring: Perry Butler or Judy Leas
061-833 9341/5
143/144 Royal Exchange, Manchester

CONTRACT FOR 1979 FOR KPSL MEANS

- ★ High remuneration assured throughout the year
- ★ Security of employment from continuity of work
- ★ Career development from learning new DP techniques
- ★ Overseas opportunities
- ★ Financial advice in all matters of taxation, mortgages, pensions

LONDON & HOME COUNTIES

£200 ICL 1900 COBOL GII
£220 ICL 1900 COBOL TPS EXP
£200 ICL 2903 TPS EXP
£220 ICL 1900 PLAN + COBOL
£220 IBM PL/I OS
£200 + IBM COBOL DOS VS
£220 IBM PL/I UNIPAY EXP

CITY
CITY
ESSEX
HERTS
BERKS
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CITY

£240 IMS OB/OC PROG/ANALYST
£200 UNIVAC 1100
£230 POP MACRO II RSXIIIM
£240 MINI ASSEMBLER PROCESS CONTROL
£230 POP MACRO II + CORAL
£260 TEAM LEADER BASIC COMPILER
£230 CORAL/ALGOL/FORTRAN COMPILER

BEDS
ESSEX
CITY
SURREY
HERTS
HERTS
HERTS

OVERSEAS

£ EXEC RATE
£ EXEC RATE
£450 p.w.

£375 p.w.
£375 p.w.
£375 p.w.
£425 p.w.
£375 p.w.

IBM COBOL GERMAN SPEAKING
IBM CICS COBOL
SYSTEMS ANALYST COMMUNICATIONS
NETWORK CONTROL EXP
PDP MACRO II RSXIIIM KN OF FRENCH
PDP FORTRAN KN OF FRENCH
IBM SYST PROG OS CICS
PDP MACROII RSXIIIM
UNIVAC 1100 COBOL

GERMANY
S. ARABIA
BELGIUM

BELGIUM
BELGIUM
HOLLAND
HOLLAND
BELGIUM.

Ring Christine Kay/Dave Hayton, 734 0152/6 (24 hrs)

As a successful international recruitment and contract organisation we have considerable experience in assisting companies in industry and commerce throughout the UK and Europe, call your nearest K.P.S.L. office and discuss the many opportunities available to you.

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON, W.1 TELEPHONE 01-734 0152/6 (24 HOURS)
OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

AREA DEVELOPMENT MANAGER SURREY

Our client is an international manufacturing company with associate companies throughout Europe. They require IBM 370 under both DOS VS and CICS VS with an international telecommunications network for voice, message and data linking the UK, Holland and U.S.A. The successful candidate will have responsibility for both UK and Dutch operations, provide effective facilities for information services and management of local computer network. Part of role will be evaluation and advice on new hardware in line with current technology and related telecommunications equipment.

- Excellent career prospects
- Subsidised restaurant sports and social club
- London and local pleasant park grounds
- REF: 19494

EDP AUDIT LONDON

For those of a fresh faced, hardworking, energetic, and enthusiastic, a highly motivated professional is needed to undertake formal audits of all major systems, of data centres to undertake system reviews of all projects and to develop and participate in the cycle of systems development from project initiation through to final running and formal support. Also EDP audit and formal support for pricing systems and assistance to field auditors. Ideal applicant will have experience in IBM and preferably PDP on-line systems and use of audit control program and of programming knowledge (COBOL or BASIC) + GC others.

- SUBSIDISED RESTAURANT
- Travel facilities
- Non-contributory pension scheme
- Unusual bonus for career development
- REF: 19495

SENIOR SYSTEMS ANALYST LONDON

Excellent opportunity exists for a senior systems analyst to work within an international company providing financial information and local time systems. He/she will have a good knowledge of IBM 370/360 in a banking or financial environment and a proven record of experience in the development of large scale systems. He/she will play an important role in the development of this type of system and to work on a wide range of systems and applications.

- Financially attractive
- Excellent career prospects
- Non-contributory pension scheme
- Subsidised restaurant sports and social club
- REF: 19496

PROJECT LEADER LONDON

With turnover of £10m per year, our client, a major group of companies has business interests in the UK and overseas specialising in the provision of a wide range of products and services to various professions. Retaining PDP minis they seek person with a good programming background and at least 12 months as a project leader with one project handled from design to implementation. This is a responsible position for someone who wants to enhance their career development. Co offers:

- Opportunities for promotion to manager with a company car
- Working on a wide range of applications including micros, minis and mainframes
- REF: 19497

ANALYST PROGRAMMER LONDON

Enhance your career, this is a fantastic opportunity to progress in major company. If you have good IBM experience in programming in COBOL and ASSEMBLER or MARK IV, and at least 2 years as an Analyst Programmer apply NOW. Post involves working on financial and commercial applications and to become involved with database systems. This HAS would be an advantage Co offers:

- Regular salary reviews
- Excellent career prospects
- Say access from south close to major rail station
- REF: 19498

SYSTEMS ANALYSTS SURREY

Management can be yours! Have you the ability to make practical contributions to business decisions, communicate effectively at all levels and at least 2 years IBM systems and systems experience? If so, our client, a large insurance and financial conglomerate, would like to discuss your future. Rapid career progression and excellent client liaison. Co offers:

- Free life assurance
- Free BUPA
- Sports and social club
- Subsidised staff restaurant and lunch vouchers
- Regular salary reviews
- REF: 19499

TEAM LEADER CITY

Unique opportunity exists within this multi-national company which is currently engaged in the development of major international message switch systems using MACRO ASSEMBLER RS/II and RTII. Ideal applicants should have 5 years experience in Real time programming in Macro Assembler and RSX with message switch experience preferably. If you have the experience plus the ability to lead a small team phone NOW! Co offers:

- Up date technology
- Regular salary reviews
- Excellent career structure
- REF: 2006

SENIOR PROGRAMMER CITY

Due to expansion this multi-national bank has an opening for a programmer with at least 4 years' ASSEMBLER experience to work on IBM 370 which runs under DOS/VS. This is a very varied position which involves many new and interesting projects related to international finance. If you have the right experience and strong will to succeed then apply NOW! Co offers:

- Subsidised Mortgage
- Loan Scheme
- Annual Bonus
- Non-contributory pension scheme
- Excellent prospects for promotion
- REF: 19500

SENIOR PROGRAMMER MIDOX

Our client, a computer bureau of well-known international manufacturing company, seeks senior programmer to develop and work on various new accounting packages. Ideal applicant will have at least 5 years programming in COBOL on IBM hardware. This is a superb opportunity to follow career path, they are awaiting delivery of 3033 in March and lots of new development work is planned. Co offers:

- Flat time
- Continued development in well-planned schedule
- Progressive organisation
- Plenty of room for growth and excellent earning potential
- REF: 19501

PROGRAMMER N. LONDON

Our client is a major prestige organisation providing services to the British banking industry. They retain large ICL 1900/2800 hardware and are currently developing a major on-line communication system. Applicants should have at least 3 years' ICL COBOL experience and will be trained on new techniques in teleprocessing. Co offers:

- MORTGAGE SUBSIDY
- Relocation expenses
- Non-contributory pension scheme
- Personal Loan Scheme
- REF: 19502

SYSTEMS ANALYSTS BUCKS

Major manufacturing company has set up new installation in Buckinghamshire and seeks systems analysts to be responsible for various project teams. Hardware consists of 2 ICL 2860's linked to their other installations. This is an excellent opportunity to get involved at the beginning with fantastic career prospects. They will also consider analysts programme to train in systems analysis. Co offers:

- RELOCATION
- 5 weeks holiday
- Non-contributory pension and sick leave schemes
- Excellent career prospects
- REF: 19503

SENIOR PROGRAMMER CITY

As a wholly-owned subsidiary company of one of the largest firms of chartered accountants in the country, our client seeks a programmer for its expanding D.P. dept. With IBM 370 equipment their position is for person with approx. 3 years' IBM COBOL experience and to work on a variety of business packages.

- Opportunity to be involved in the business of a very well established company
- REF: 19504

SENIOR PROGRAMMER N. LONDON

Our client, a major American company engaged in the production and marketing of electronic equipment, is seeking a programmer who has at least 2 years' programming in RP/II. They retain IBM system 3 at present but will consider ICL RP/II as experience. Ideal applicant is someone prepared to work on a small team, prepared to accept responsibility to write programs but also get involved in systems analysis and the general running of the installation. Co offers:

- COMPANY CAR
- Bonus
- Friendly and lively atmosphere
- REF: 19505

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON, W.1 TELEPHONE 01-734 0152/6 (24 HOURS)

OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

Handwritten signature: *Handwritten signature*

DON'T JUST SIT THERE

If you want a well paid job with variety, customer contact and excellent prospects then please get in touch with us.

We are particularly looking for programmer/analysts with a minimum of three years commercial DP experience including COBOL.

You can expect a starting salary in the £6K to £8K range (plus excellent benefits) depending upon experience. We would expect you to develop rapidly and be earning £20K+ in five years time.

If you don't already live in London we do provide relocation assistance.

This is your opportunity to start a professional career with one of Europe's leading computer service companies.

Please write or telephone for more details - you will not be wasting either your time or ours. If you prefer to call me in the evening or at the weekend you may do so on Haywards Heath (0444) 53100

Brien Walters
Managing Director
CMG (West End) Ltd
Sunlay House
Bedford Park
Croydon CR0 2AP
Tel: 01-686 8251
Ref.: W/4

*Have a prosperous
New Year with CMG*

OPERATIONS CONTROLLER SHIFT LEADER

FOR 2.75 Mb 2960

Applicants for the post of Shift Leader should have experience of running a team of approximately 15-20 staff in a shift system.

Prospective Operations Controller should be highly motivated computer professionals with a minimum of 5 years experience in a shift system. They should be able to manage a team of staff and be good communicators who are extremely practical in their approach to the problems. A salary of £1500 to £1800 is offered.

Both these positions offer good career prospects including training and development courses and carry a number of good company benefits.

For further details please ring Mr. Carr on 01-225 1234 x 2111.

OUR JOBS ARE OPEN TO ALL RACES AND BOTH SEXES.

THE HAMMILL Northamptonshire LECTURER IN COMPUTER SCIENCE

Required as soon as possible to teach on the National Computing Centre 'Threshold' course. Some GCE 'O' and 'A' level work is available. Ability to teach COBOL an advantage. Salary scale £132 to £634 per annum, entry point determined by qualifications and experience. Further details and an application form can be obtained from the Principal, The Hammill College, Kettering, Northants, St. Mary's Road, Kettering. Telephone: Kettering 85353.

GEORGE II OPERATORS

move to
ICL 2960's

in West London
C. £4,300

One of the major UK breweries have recently ordered two ICL 2960's. These will be installed early next year and will replace the current hardware of two ICL 1903T's running under GEORGE 2S.

As one would expect from a major brewery conditions of employment are first class and include:

- ★ start salary of c. £4,300
- ★ excellent restaurant
- ★ ample car parking
- ★ first class career opportunities
- ★ FREE BEER of course!

Three operators with upwards of one year's operating experience on ICL 1900 mainframes, running under GEORGE 2, are required to complete the existing operations team. Three shifts are worked and with the arrival of the 2960's in the near future, prospects for career advancement are excellent.

For further information (including a data sheet describing our clients installation) contact our CROYDON office quoting ref: CW 53-9S.

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS **CAPP ASSOCIATES** 10 PARK STREET, CROYDON CR9 1TN 01 686 9693

D. P. Manager

North East Kent, to £8,000

A major British company involved in the important field of transmission and distribution of electrical energy requires a manager to assume full control of the DP installation at its N.E. Kent manufacturing site. The key priorities of this new appointment are reviewing all current applications, personal involvement in the development of new systems and advising on updating of

existing hardware. The successful candidate must be familiar with the DP requirements of a manufacturing organisation. He or she must be able to demonstrate sound technical ability in the areas of systems design, and COBOL programming and have had previous management / supervisory experience. This position offers a comprehensive employment package together with excellent career prospects.

E. Sutton, Ref: 17047/CW.

Male or female candidates should telephone in confidence for a Personal History Form to: LONDON: 01-734 6852, Sutherland House, 5/6 Argyll Street, W1E 6EZ.

Hoggett Bowers
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HERTS AND

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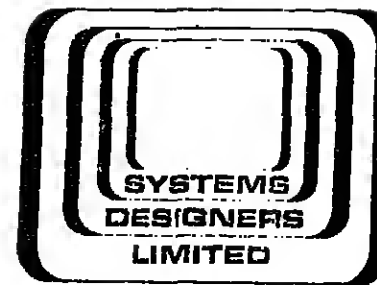
We specialise in D.P. recruitment in the Herts/N. London area and the following vacancies are a selection from our current register.

- | | |
|----------------------------|--|
| STANMORE | S.A. £6500 + non-contributory pension. |
| HEMEL HEMPSTEAD | IBM Cobol Prog. 12/18 months' exp. Small department. £5000. |
| HARROW | S.S.A. Normal commercial experience. £7000/£8000. Anal./Prog. £6000+. |
| EOGWARE | S.S.A. up to £5800. Sen. Prog. IBM or Univac, up to £5800. Operators. IBM or Univac, up to £4500. |
| WATFORD | Sen. Progs. Any Cobol 3/4 years. c. £5000+. |
| LUTON | Syst. Prog. PL/1 and Assembler. £7000/£7500. Anal. Prog. PL/1 or IBM Cobol. c. £6000. Sen. Prog. PL/1 or IBM Cobol. £5500/£6000. Jun. Prog. 6 months' PL/1 or IBM Cobol. |
| POTTERS BAR | Prog. or Prog. Anal. min. 1 year any Cobol, up to £5500. |
| ENFIELD | Prog. or Prog. Anal. min. 18 months any Cobol, up to £5500. |
| ENFIELD | Experienced ICL Operator, c. £4000. |
| WEMBLEY | PL/1 or IBM Cobol Progs. £6000+. |
| BARNET | Cobol Prog. to learn PL/1, 18 months + exp. Up to £5500. Non-contributory pension. |
| MARYLEBONE | S.A., 2 yrs. IBM background for financial projects. £7000/£8000. |

For more information ring:

HAYMARKET COMPUTING LTD.

Tel: Cuffley (Herts) 4130
up to 6.30 p.m.



Programmers & systems engineers in Manchester: up to £6,500

Systems Designers Limited is an independent British systems consultancy, backed by the NEB, and with an unrivalled reputation in mini and micro computer applications. Established in 1968 and currently 150 strong, the company is expanding its operations in both the UK and abroad. A full order book and continued demands for our high quality services have produced a number of professional programmers and systems engineers for our Manchester office.

Current projects are challenging and rewarding and the company policy of full participation of all members offers broad prospects and opportunities for rapid progress for our people.

Requirements exist for people with broad experience in the design and implementation of mini and micro computer systems using both assembler and high level languages. We are interested in hearing from programmers and engineers with at least two years' experience. Applicants must have good academic qualifications and a proven software ability, together with a professional outlook.

Please write to or telephone: Alex Bayat
101 Hulse, Woodlands Road, Altrincham
Cheshire WA14 1TH
Telephone: 061-928 9105

TRAVEL INDUSTRY

A highly personalised British company specialising in the development and provision of turnkey systems for the travel industry is expanding to new premises at Maidenhead, Berkshire and has several vacancies for professional staff.

PROJECT LEADERS SYSTEM DESIGNERS PROGRAMMERS

The Company has vacancies for three project leaders and six system designers / programmers to design and implement three major systems. Applicants should be experienced in the design and development of real time systems. Project leaders should in addition have demonstrated an ability to define and document programming requirements for more junior staff. Experience of PDP 11 software or CORAL 66 would be an advantage. Salaries of up to £7000 plus usual benefits are offered for these posts.

ENGINEERS

The Company has vacancies for three engineers to help to set up and lead system commissioning and field service teams. Applicants should have appropriate computer or electronic engineering qualifications and at least five years experience of management for these functions for mini-processor and computer terminal systems. Salaries of up to £6500 plus usual benefits are offered for these posts.

For further details of the Company, job specifications and application forms please telephone 0494 39186.

Handwritten note: 0494 39186



Data Processing Recruitment Consultants

Teleprocessing and Database Scandinavia + London

Salaries: c.£16K

One of the World's foremost Software Specialist Groups having its H.Q. on the East coast of the States has requested Logistix to identify top calibre Teleprocessing and Database Applications and Systems/Software Personnel up to PROJECT MANAGER level and beyond for both career positions and one year contracts in Sweden and London (and possibly in mid-1979 for Switzerland). Suitable applicants must demonstrate real knowledge of current IMS (both DB and DCI) releases in either an Applications or Software realm allied to current or very recent COBOL, PL/1 or B/L programming involvement. It is anticipated that all

candidates will have worked with IMS applications for two years or longer. Applications areas include on-line enquiry systems, banking, sales ordering, stock/inventory control budgeting and forecasting. The scope of projects and the prestige of working with this acclaimed Market Leader will be certain to appeal to the most demanding career minded individuals. The high salaries reflect the prominence which our Client places on the acquisition of these key personnel who are certain to rise rapidly to Consultancy or Management levels should the individual desire.

Systems Development (Pre and Post Sales) Central London & Thames Valley

Salary: to £10K + car

Two divisions of a prestige Systems and Software Development Group are seeking additional personnel at all levels of experience.

Generally speaking applicants should have experience in one or more of the following application areas:

COMMERCIAL — equipment selection and implementation, organisational reviews and systems development plans.

TECHNICAL — uniplex design, operating systems and communications software. In both divisions you will be given opportunities to act in a pre or post

sales environment.

The company offers an outstanding portfolio of company benefits including a minimum of 4 weeks holiday allowance, Group medical insurance and life assurance are already in operation whilst more senior staff are eligible for an annual bonus (currently assessed at 10% of salary). Full removal assistance is available where appropriate. Local interviews in Greater Manchester, Central London and Reading will be arranged to suit requirements.

Data Transmission & Networking Copenhagen

Salaries: to £15K

We have several outstanding permanent career vacancies for Scandinavia's foremost Hardware and Software Systems supplier.

Particular machine experience is not essential but those who have an in-depth knowledge in message/telex switching and packet switching, data communications and protocol procedures will prove invaluable to the growth pattern this company wishes to achieve in 1979.

Of special interest will be PROGRAMMERS and

SYSTEMS DESIGNERS with very recent or current knowledge of the following:
(a) Mini Computers: (i) DEC PDP 11 and VAX (ii) DG Nova/Eclipse (iii) HP 2100
(b) Mainframes: (i) Univac 490/1100 (ii) IBM 370 (large machine only).
Interviews will be held by us in mid and late January, after which selected candidates will be invited to spend a day on the company's premises for final selection.

Burroughs Programmers and Analysts Netherlands and Belgium

Salaries: £12K-£15K

An Important Financial and Banking Institution based in Benelux and having one installation in the Netherlands and its Headquarters in Belgium requires PROGRAMMERS and ANALYSTS to join its Development Teams in Spring 1979. Both installations run BURROUGHS mainframe hardware and consequently it is a pre-requisite to offer current expertise on that Company's medium and large scale equipment either in a Programming or Analytical/Designing capacity. These positions represent an outstanding opportunity for those who have had exposure to Financial, Commercial and

Banking applications. You will be offered a permanent career position at one of the two installations and be expected to integrate into both the work and social fabric of the local community. To assist you, generous relocation and accommodation allowances will be paid, language tuition courses are available for all employees. Whilst we will conduct Initial Interview, you will be required to spend one full day at the Company's Headquarters — of course at its expense for further interview and selection.

Small Business Systems London and Home Counties

Salaries: £5K-£8K (+ bonus)

A multi-national Manufacturing and Package Development Company decentralised throughout London and the Home Counties (both South and North of Thames) is seeking additional Programmers and Systems Analysts in both pre and post sales capacities who will be engaged in the development of a variety of new commercial applications. Suitable applicants are likely to have worked already for a V.R.C. supplier, Mini or Micro Manufacturer or in an O.E.M. environment. Naturally past programming performance will be most

important and these candidates with knowledge of either Basic or Business Assembler will be of particular value reflected in the above market salaries you will be offered. Additional fringe benefits include a non-contributory pension scheme, sickness and medical benefits, life assurance entitlements, project performance bonus and a minimum of 20 working days holiday. Interviews throughout January and February will be held at the branch office most convenient to individual candidates.

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Telex 28800



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Would you like to join a creative team of Mini Computer specialists working on distributed processing systems within a business environment? The ideal hardware is IBM/AS/400, however any experience of either is of minimal importance. Successful candidates will have substantial experience of Mini Computers, preferably with Assembler and/or a high-level language within a Real Time environment. Initial four days of training will be given to the candidate to transfer to the Company's UK headquarters or, alternatively, for a further year, full relocation expenses will be paid for yourself and family. A generous overseas allowance (tax free) is also offered.

DISTRIBUTED PROCESSING
£9K + Discs Allow.

MINI MICRO HOLLAND

The Dutch subsidiary of a World renowned International group specialising in Mini and Micro based systems including Communications, Message Switching, Process Control and Networking are seeking Consultants, Analysts and Programmers with some direct experience of any of these areas. Whilst Graduates are preferred you will certainly be considered if your experience is in depth. Assembler is the primary programming language. All relocation expenses for you and your family will be client paid as will initial accommodation costs. Home tax concessions are available associated with excellent salaries and promotional prospects. All positions are open to single and married personnel.

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LONDON £7.9K
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BRITAIN & GERMANY
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MATRIX

This California based International Company has openings in its London, Amsterdam, Frankfurt and Zurich offices for Database Administrators, Designers and Applications Programmers. Any experience of current DBMS would be useful whether on Mainframes or Minis. Of particular interest is IMS, TOTAL, ADABAS, DMS, IDMS, etc. Hardware background is of no consequence what is important is your depth of experience in your relevant area of Database expertise. You will be joining a market leader in the design and implementation of advanced Database systems. They offer unequalled opportunities to develop your career at the sharp end of technology.

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Applications to:
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S.D.

STEVENAGE COLLEGE
DEPARTMENT OF BUSINESS AND PROFESSIONAL STUDIES

LECTURER GRADE II
in COMPUTER STUDIES

With experience in Bookkeeping and Accounting Systems

Applications are invited from suitably qualified persons for the above post which is available from 1st February 1979.

Further details and application forms, returnable within 14 days of the appearance of this advertisement, are available from the Principal, Stevenage College, Monkswood Way, Stevenage, Herts SG1 1LA.

THE OPEN UNIVERSITY
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RE-ADVERTISEMENT

LECTURESHIP IN COMPUTER STUDIES

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Successful applicants will be involved in the writing of a second level computing course to replace the Faculty's two existing courses PM 951 "Computing and Computers" and M251 "An Algorithmic Approach to Computing".

Application forms and further particulars are available from the Recruitment Office (MB234/1), The Open University, P.O. Box 75, Walton Hall, Milton Keynes MK7 8AL, or telephone Milton Keynes 63408; there is a 24-hour answering service on 63888.

Closing date for applications: 31st January, 1979.

★ IBM COBOL PROGRAMMER ★

Permanent or contract from Feb./Mar. to work in project team developing financial systems on an IBM 370 for a North of London client.

Experiences and opportunities for team database techniques.

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As a leading financial organisation, we are able to provide excellent career opportunities in data processing which begin with a structured training programme, tailored for Operators and Controllers with the right background which should have included IBM OS.

In our friendly, well integrated Systems Division we are working on exciting database developments for management information, CICS, word processing and other systems. The mainframe, a present large IBM 370, will be connected to a network of specialised minis initially 3790's upgrading to B100's.

We will train you to the high standard required for your future involvement with MVS, TSO, teleprocessing and distributed processing hardware. You could be working COBOL within six weeks, and work on a project right from the start. Our training makes use of Improved Programming Techniques.

Promotion prospects for men and women within this dynamic and progressive organisation are extremely favourable. Benefits include exceptional salaries, non-contributory pension schemes, free life assurance, BUPA, flextime, LVE and sports and social club. For an application form please write to:

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Lowndes Lambert Group Ltd,
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Tel: 01-283 200 Extension 3105.

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BOROUGH OF SOUTH TYNESIDE
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SYSTEMS ANALYST (2)
£5232 to £5588 inclusive

SENIOR PROGRAMMER
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The Authority is now actively planning for the introduction in late 1979 of an ICL 2850 Computer with communications equipment to replace an ICL 1902A.

Applicants to join the Computer Division should have relevant experience, with knowledge of GEORGE 2 and on-line processing an advantage. Training will be given if required.

Application forms are available from the Chief Personnel and Management Services Officer (Ref. 64), Westoe Hall, Westoe Village, South Shields, Tyne and Wear (Tel. South Shields SS2191) and should be returned by noon, 19th January, 1979.

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The major development phase, commencing with an integrated Production Control System, promises SUBSTANTIAL CAREER OPPORTUNITIES to the computer professionals involved at this stage.

Your background should comprise sound COBOL programming experience with some Analysis and Design, ideally in an on-line environment.

As the leader of the programming team

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They see the challenge as being attractive to a self-motivated individual, possessing good communication and his fair share of energy. We also feel that you will find your working environment — set near the Thames particularly pleasant.

Please write in confidence with a brief career history and personal details to:

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indicating the names of any companies to whom you do not wish your applications to be forwarded.

Servelec ANALYST/PROGRAMMERS
TO £8,500 + BONUS

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We offer rapid career development with regular salary reviews, staff pension and insurance schemes, together with all the usual company benefits.

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All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied, 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016.

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A leading banking organisation wish to appoint a senior analyst in their computer division to provide a detailed technical service to the central board. The work will be highly varied but principally concerned with the evaluation of hardware and software for communications systems, both large and small networks, supporting a wide range of peripherals.

Candidates should be qualified to degree level and have an impressive track record in the d.p. industry to a point beyond conventional systems analysis. The ideal candidate will have sound experience in at least three of the following: systems/operational software design; real time/database techniques; data communications and security systems; mini/micro computer hardware/software; peripheral product/prototype development; hardware sizing and configuration.

The appointee will enjoy high remuneration, non-contributory pension scheme, free life assurance, and house mortgage subsidy in addition to generous relocation expenses where necessary.

Contact: Mike Creamer

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COMMERCIAL SYSTEMS PROGRAMMERS DM 46K - DM 60K

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| RESPONSIBILITIES | — To develop a range of Commercial Systems Applications on advanced real time equipment — taking total responsibility for launching the systems into the international market place. |
| LOCATION | — Choice of three, all based in Germany — with superb facilities. |
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Applications are invited for this post which will be based at the Board's Orpington office and will be concerned with the development and administration of systems for the Board's examinations. Candidates should possess a degree or a similar qualification and should have experience in at least two of the following areas: administration of examinations; development of systems; application of computer processing to administration; application of statistics to education. Salary £5890 x 235 (5)-£7065.

Application forms and further details concerning this post may be obtained from the Secretary to the Examinations Board, Royal Society of Arts Examinations Board, 18 Adam Street, Adelphi, London WC2N 6AJ, to whom completed application forms should be returned by 31st January, 1979.

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in the College's Department of Applied Sciences. The successful candidate will be responsible for the design and development of a new research project in the field of computer science. The successful candidate will be required to design, develop and test a computer system which will be used for the purpose of research. The successful candidate will be required to design, develop and test a computer system which will be used for the purpose of research.

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IAL, with a 30 year background in communications systems is currently engaged in the supply of computer-aided dispatch systems, both in the UK and overseas. For example, systems are in operation with police forces in this country handling police incidents and aiding resource allocation on a fully real-time basis. IAL is also currently working on a major project for a Canadian city where all three emergency services — fire, ambulance and police — are being totally integrated. Further projects of a similar scale and nature are currently under consideration in a number of locations world-wide.

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Applications are welcome from both men and women.

IAL Aviation and Communications Systems and Services—worldwide

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Computing
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Tel: 01-242 2142 or if you prefer, write to: hup at

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wishing to step into DP MANAGEMENT

DP MANAGER c. £4,500

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The successful applicant will be expected to liaise with the software house development turnkey systems; supervise their successful installation, and ensure the efficient daily running of these and existing systems.

At present the system covers the Accounts and Newspaper Circulation functions. Future developments include Advertising Order Entry and, possibly later Newspaper Production systems.

The job should appeal to senior operators or those of similar calibre, who are ready to take the first step on the management ladder. An enthusiasm for programming, with a view to carrying out minor modifications, would be desirable.

The installation is in the early stages of development, and there is scope for an ambitious person to develop along with it.

The Group's offices are situated centrally in the attractive city of Lincoln, where commuting could be a ten-minute walk.

The usual benefits associated with a major company are offered.



Write for an application form to:
Mrs. A. Freeman
Lincolnshire Standard Group Ltd.
Witham House
Petham Bridge
Lincoln LN5 5XE
or phone Lincoln 31631

BBC COMPUTER SERVICES

Technical Support Unit

PROGRAMMER

to support IDMS on ICL 2960s

The Installation includes 2 ICL 2960s running under VME/B, supporting TP, MAC, distributed processing and IDMS database.

We now seek someone with experience of database implementation (not necessarily under IDMS) to join the Technical Support team. He/she will assist us in supporting IDMS users of BBC computers, by consultancy, project participation and training, implementing, testing and maintenance of database software and development of new facilities.

The Technical Support Unit is located at the BBC Computer Centre in West London.

The salary will be in the range £5,200-£6,800 (currently under review).

Please apply for an application form enclosing addressed envelope and quoting reference number 1866/CV to Appointment Department, BBC, London W1 1AA, telephone number 01-444 4488 Ext. 4618.



MID DEVON DISTRICT COUNCIL

Treasurer's Department

Systems Analyst and Computer Programmer

Salary Grade AP4/5
(£3823-£4761 + £312 supplement)

Applications are invited for the above post from men and women with a minimum of two years' experience in programming. The present equipment comprises 2 Brouha L3000 programmed in LITE Assembler (GP 3000) and an IBM 3741 programmable work station programmed in ACL with teleprocessing links to Plymouth City Council's IBM 370.

The Postholder will be the senior member of the Computer section and will have the opportunity to gain useful experience in a variety of applications. Preference will be given to applicants with local government experience.

The Department is located in the market town of Tiverton which is situated close to the M5 motorway and is surrounded by delightful countryside. Assistance towards removal expenses, legal fees, etc. (maximum £350) are available to officers recruited from outside the District Council area. Application forms and further particulars can be obtained from Mr. J. W. Lyle, Personnel Officer, Mid Devon District Council, 2 St. Peter Street, Tiverton, Devon (Tel. Tiverton 4911 ext. 210), and should be returned by Friday, 26th January, 1979.

DP Consultancy

People & Computers

Computer professionals build their early career in a technical world where the emphasis is on the computer. If computer systems are to work however, it is the people who use those systems who are important!

Consultancy offers a career step to experienced computer professionals which will build on their technical knowledge by giving them opportunities to develop computer systems from the standpoint of top management and user management, and to gain experience in designing and implementing computer systems with this "people dimension" uppermost in their minds.

Added to this is the variety of environments — company, industry, systems — with a consequent opportunity to consider various ways of organising EDP departments and computing/communications facilities.

We are looking for a few people, in the preferred age group 25-35, to whom this prospect is attractive. If you are interested, please telephone Ernest Morris on 01-806 4010, ext. 2665.

Coopers & Lybrand Associates Ltd.
Management Consultants
Shelley House, Noble Street, London, EC2V 7HQ

THE UNIVERSITY OF MANCHESTER REGIONAL COMPUTER CENTRE

Director Professor Gordon Black

Applications are invited for the following vacancies

SENIOR PROGRAMMER OR PROGRAMMER

The successful applicant will lead a team responsible for the development and support of the OROF 3 Operating System on ICL 1902A/1904S and will be involved in planning future installation developments in the Centre. Current projects also include the implementation of the University of Manchester Network System and the investigation of live data systems and replacement procedures.

Applicants should be educated to degree standard and should have experience of system programming. Experience with ICL 1902A/1904S and the successful candidate will also be expected to have experience of the University of Manchester Network System and the investigation of live data systems and replacement procedures.

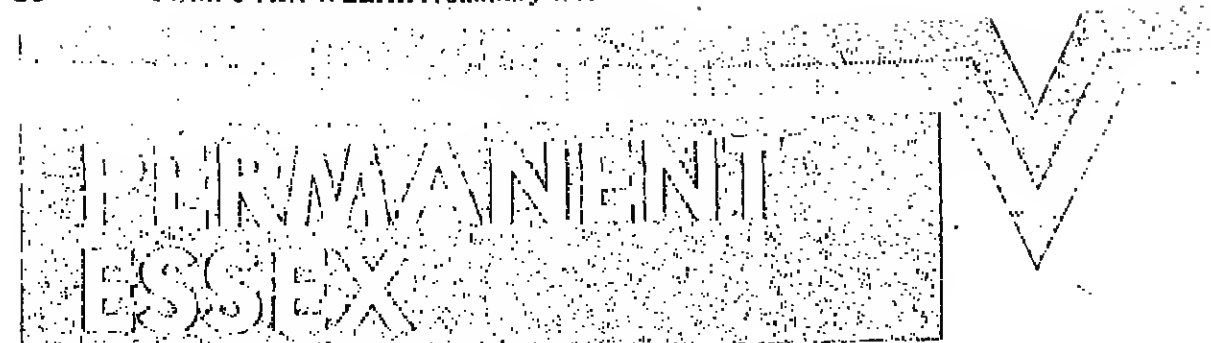
Salary: £3,883-£6,569 p.a. or £5,117-£7,784 p.a. (US\$ 7797/£W)

TWO ASSISTANT COMPUTER OFFICERS

These posts will be in the documentation and information section which is responsible for acquiring technical and organisational information presented through the Centre. This section is part of the University of Manchester Network System and the investigation of live data systems and replacement procedures.

Applicants should be educated to degree standard and should have experience of system programming. Experience with ICL 1902A/1904S and the successful candidate will also be expected to have experience of the University of Manchester Network System and the investigation of live data systems and replacement procedures.

Salary: £3,389-£5,833 p.a. or £4,384-£6,604 p.a. (US\$ 6497/£W)



Systems Analysts

c £6.5

Our Client, currently developing Real-Time MIS systems, is looking for good Analysts to help enhance their current developments using a cluster of Univac. Should you wish to enlarge your experience with on-line Real-Time experience, please do not hesitate to phone.

1C419

Senior Analysts

c. £7k

A large manufacturing and wholesale Company is seeking persons with sound analysis experience to develop and enhance the business. Backed by a large IBM configuration, these opportunities provide you with an excellent chance of furthering your career immediately. For further details phone now!

2C419

Analyst/Programmers

c. £6.5k

If you are seeking variety, a dynamic working environment, fast career progress and good technical training based on IBM mainframes this opportunity may be of interest to you. Our client runs a Real-Time network located in a rural setting, where living costs are well below the average for the S.E. No matter what your programming or analytical experience a phone call could change your whole lifestyle — for the better!

3C419

Analyst/Programmers

c £5.5

If you are good at RPG2, are familiar with any machine in the IBM System 3 range and you have a flair for commercial analysis and design then do not hesitate to contact us now! Located in a very pleasant country village our Client offers a good career path and excellent opportunities.

4C419

Assembler Programmer

c £6.5k

This is an excellent opportunity for an ex-Systems Programmer, or a very competent assembler programmer to help develop an On-Line Real-Time system. The kit is IBM mainframe and the application will involve production control sites and some process control. Our Client is a large manufacturer and offers numerous company benefits. Please phone now for details.

5C419

Systems Programmer

c £7k

Our Client, a large multinational Company, operating an IBM 370 machine under OS-VS is looking for a really good 'practitioner'. If you are keen to learn, eager to progress and have the ability to really make things 'tick' then do not hesitate, phone now for a quick assessment of your chances.

6C419

Analyst Programmers

c £6k

If you have at least two years' experience in either Cobol, Assembler or PL1 and you wish to progress rapidly into either Analysis, Project Management or Software development then our Client would be very interested in talking to you now. Numerous large company benefits are offered with these interesting positions.

7C419

Programmers

c £4.5k

Our Client is currently running an ICL 1900 kit but is shortly to purchase powerful ICL 2900 series machines to increase business. So, if you have only 18 months' COBOL experience, preferably on ICL kit, and like working in excellent surroundings which will be supplemented by the usual perks one comes to expect from a leading Bank, then pick up the phone and find out more now!

8C419

Systems Designers

c £7k

If you call yourself a 'designer of systems' or if you would like to be known as one, then here is an excellent opportunity to do so now! Our Client is looking for persons with good analytical and design capability preferably on IBM kit to help them get a new development phase off the ground.

9C419

If you can't see anything here that suits you, still get in touch with us — We have many additional well paid vacancies in Essex and the City.

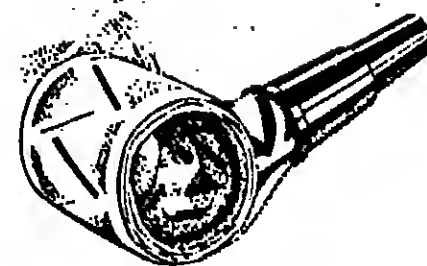
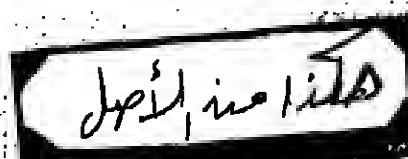
Telephone — John McLean for an up-to-date list of current opportunities on —

BRENTWOOD (0277) 212021

or write to him at: —

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LINSCOTT
Computer Systems Limited



WISH YOU A HAPPY AND PROSPEROUS NEW YEAR

If you don't expect it to be busy or prosperous then make a resolution to come to our next open evening, later this month.

We are looking for good IT professionals at all levels to work on mainframe and mini computer projects. We are also looking for a very good Sales Person to sell our services in our local area.

Look at next week's advertisement of the date and venue for our open evening and if you prefer to make contact now please call or write to: **Square One Computer Services Ltd.**

The Limes, 130 High Street, Chesham, Bucks. HP8 4JL



Computer Professionals ... Move up to Northamptonshire

Why Northamptonshire? It's a great place to live, for a start. It's a beautiful, rural county with good communications to all parts including the East Coast and housing at reasonable prices. We'll help with relocation costs and there is also good rental accommodation available.

In addition to this our Computer Section at the County Council is expanding. The current 1900S will be replaced by a 2 megabyte dual 2960 in 1980 — and our current on-line service to many District Councils will be expanded to cater for VDU's. The computer will run under the VM/370 operating system.

So there's plenty of work to get your teeth into — a nice place to live it — and there'll be opportunities for promotion in the future. To fulfil our requirements we now need the following men or women:

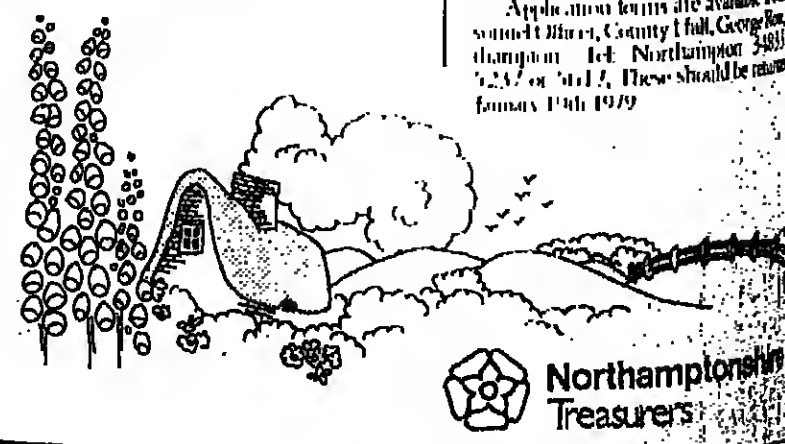
Team Leaders

15,000 p.a. — to lead teams of analysts and programmers on a variety of business and non-business projects. You'll need at least 3 years experience.

Senior Analyst/Programmers 13,000 p.a. — to lead teams of analysts and programmers on a variety of business and non-business projects. You'll need at least 3 years experience.

Trainee Programmers Up to 11,000 p.a. — ideally self-motivated, but if you've got a "can-do" attitude we'll train you.

We've got a lot going for you in Northamptonshire. Find out more by phoning John Morris, our Computer Manager, at 55 Chesham Road, Chesham, Bucks. HP8 4JL. Appointments are available from 10.00am to 1.00pm, Monday to Friday. These should be made by January 14th 1979.



LECTURESHIP IN SYSTEMS ANALYSIS

Applications are invited for appointment from October, 1979, to a Lectureship in Systems Analysis. A specialist in systems design for design, real-time, distributed systems would be an advantage.

Appointments will be on the salary scale for lectureship of £2,883 to £7,124 a year, plus 1450 London Allowance. In assessing the salary, salary, consideration will be given to qualifications, age and experience.

UNIVERSITY COLLEGE LONDON The INDRU Group

2 RESEARCH ASSISTANTS

for a project in experimental work with ARPANET, SATNET, the Post Office Mail and other systems. A degree and programming on PDP-11 computers. A degree and programming with systems programming for microcomputers qualifications.

SALARY RANGE £4,000-£5,000 p.a. Applicants should send a Curriculum Vitae to Professor Peter T. Kirstein, Dept. of Computer Science, University College, London, Gower Street, London WC1E 6BT.

SENIOR SYSTEMS OPPORTUNITIES NORTH WEST

FRASER WILLIAMS AND PARTNERS LTD

Our client, one of this country's leading organisations based in the North West of England, wishes to recruit a number of experienced systems development staff.

The company makes extensive use of data processing as an essential aid to the successful running of the business. As a result the opportunities within the data processing function offer successful candidates a stimulating and rewarding career with promotion being limited only by the capability of the individual concerned.

THE VACANCIES

There are vacancies at various levels in the organisation and these range from systems analyst positions through to project leader appointments. The work, which is varied, will involve working in project teams developing a wide range of commercial, administrative and financial systems, utilising the latest hardware and software.

CANDIDATES

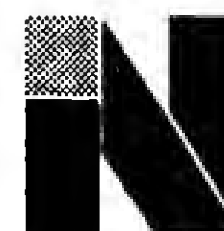
Candidates for systems analyst positions should have three to four years systems and programming experience. Project Leader candidates should have around seven years experience including previous supervisory responsibility. Good educational qualifications are required and also the personality and initiative to warrant further promotion at an early stage.

BENEFITS

Successful candidates will be offered an extremely attractive package which will include a starting salary in the range of £6250 to £7250, plus a very attractive bonus scheme and other significant personal benefits. In addition our client will offer a full relocation package to candidates needing to relocate to take up an appointment.

These appointments offer every opportunity for the successful candidates to develop their career in a very forward looking and progressive installation, an installation where such things as database, real-time and on-line systems are the rule rather than the exception.

To arrange confidential interview telephone or write to Ivor Norton with brief career details quoting reference number CW/79001 at your nearest office. Preliminary interviews will be arranged on a regional basis to suit the convenience of suitable candidates.



Ivor Norton Management Services Ltd

Recruitment Consulting Division

52 Shaftesbury Avenue, London W1V 7DE. 01 734 8862 (Day or Evening) P.D. Box 63, Copthall Tower House, Harringate HG1 1TS. Tel: Harrogate 66629

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DATA PROCESSING MANAGER

Reporting to the Financial Controller, the Data Processing Manager will be responsible for all areas of Data Processing including systems and programming. The relative department will employ an IBM System 32 together with a 5230 data collection system.

The successful candidate will ideally have proven Analysis/Programming experience and now be looking towards D.P. management opportunities.

Apply giving details of age, experience and education in strict confidence, marked private and confidential to: —

D. J. McDonagh, FCA, G.T.P. Ltd.
Sandy Road, Galway, Ireland

THE OPEN UNIVERSITY STUDENT COMPUTING SERVICE

COMPUTER OPERATOR

Applications are invited for a post of Computer Operator at the North West London Installation, Parallel College, Finchley Road, London. The Student Computing Service maintains a large national time-sharing network using Hewlett-Packard 2000 and DEC-20 computer systems which provide a practical computing service to 30,000 students via remote terminals. Previous experience with DEC computer systems would be an advantage.

Salary, according to age and experience, will be within the range £2,678-£3,084 (under review). Two shift working will be required for which an allowance of £345 will be paid. There is also a London Weighting allowance of £490. The University offers an annual holiday allowance of 10 days in addition to a University closure period of one week at Christmas and Easter.

Application forms are available from The Recruitment Office (JD631/1), The Open University, P.O. Box 75, Watton Hill, Milton Keynes, MK7 8AA, or telephone Milton Keynes 33404; there is a 24 hour answering service on 33888. Closing date for applications: 10 January 1979.

COMPUTER PROGRAMMERS — £4500 —

Vacancies currently exist for experienced programmers to join an existing team. New systems are being developed for the Honeywell 64/30 and Level 6 mini-computers which are to be used in a distributed environment.

THE APPLICANT: will have at least 2 years' Cobol experience and although experience using Honeywell equipment would be advantageous, it is not essential. If you are interested in working where initiative is encouraged within a small but expanding team, please write with full details to: J. D. Hill, (D.P. Manager).

Co-operative Retail Services Ltd.

National Office
29 Denton Street
Manchester M44BA.



ICL TECHNICAL PROGRAMMER

A Senior Person with experience of MAXIMOP, FORTRAN or ALGOL and PLAN on ICL 1900 to assist an existing client located 30 miles north of London with the implementation of a data communications system and staff education.

Either a permanent position on our staff, 8 months contracts envisaged. Contact Chris Phillips or Ian Gold on 01-388 0036.

Fraser Williams
computer consultants

WELCOME TO 1979 CAREERS

£3,000 to £4,300 S.E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them. CW 1/8 TRICIA

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£3,900 to £8,200 LONDON, HOME COUNTIES AND MANCHESTER

We are inundated with COBOL, ASSEMBLER and PL/1 vacancies. If you have more than one year's experience, why not ring now for a confidential chat? After 8 years in the business we really know the market place. CW 1/9 KAY

SENIOR CONSULTANTS

£8,500 to £12,000 CENTRAL LONDON

Six large, well-established consultancies wish to recruit suitable people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or ICL JCL ranges are essential. Excellent benefits and prospects. CW 1/4 MICHAEL

MINI COMPUTER SALES ENGINEER

£9,500 + CAR + COMMISSION MIDLANDS AND LONDON BASED

Two major mini manufacturers require experienced salesmen with real-time or process control sales experience. These firms are going places so join now. Oude earnings up to 13K in first year plus excellent perks. CW 1/13 MICHAEL

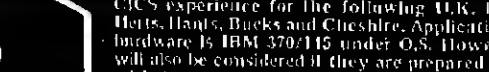
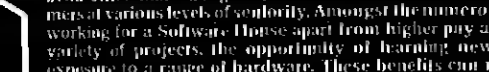
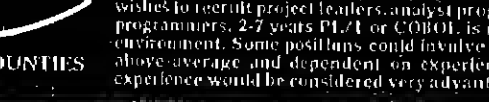
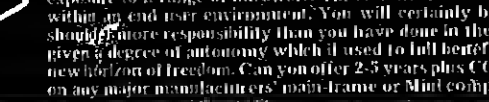
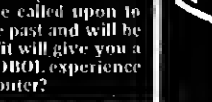
FREELANCE PROGRAMMERS

to £400 p.w. UK & OVERSEAS

US: COBOL, PL/1, BASIC, 4 months + 10% 2000 Analysis 3 London 2 months + 10% IBM: COBOL, PL/1, BASIC, 3 months + 10% 2000 Analysis 3 London 2 months + 10% 2000 Analysis 3 London 2 months + 10% 2000 Analysis 3 London 2 months + 10%

Apply NOW for the latest vacancies. IBM, HONEYWELL, DEC & ICL programmes welcome. Email a Christmas holiday card to Fraser Williams & Partners. Ask for details on 01-955 4148.

01-955 3888 or 01-955 8138 evenings

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|--|--|--|---|
|  <p>CICS</p> <p>LONDON & 11 COUNTIES SALARY: £6-7.5K</p> | <p>International company requires COBOL or PL/I programmers with CICS experience for the following U.K. locations: Central London, Herts, Hants, Bucks and Cheshire. Applications are comprehensive and the hardware is IBM 370/115 under O/S. However DOS/VSE programmers will also be considered if they are prepared to switch to O/S. The client wishes to test project before and select programmers, senior and junior. PL/I or COBOL is required with paid computer and training environment. Some positions could involve U.K. travel. Salaries will be above average and dependent on experience. Database applications experience would be considered very advantageous.</p> |  <p>COBOL</p> <p>SOFTWARE HOUSE LONDON £6-8.5K</p> | <p>A prestige Software House has immediate vacancies at their London head office and throughout the Home Counties for COBOL programmers at various levels of seniority. Amongst the numerous advantages offered include: Software House apart from being one of the scope and variety of projects, the opportunity of learning new languages and exposure to a range of hardware. These benefits can rarely be offered within an end user environment. You will certainly be called upon to shoulder more responsibility than you have done in the past and will be given a degree of autonomy which will lead to full benefit will give you a new job/area of freedom. Can you offer 2.5 years plus COBOL experience in any major manufacturer's mainframe or Mini computer?</p> |
|  <p>PL/I & COBOL</p> <p>HAMPSTEAD SALARY: £6-8.5K</p> | <p>A prestige computer manufacturer has immediate vacancies at various Hants/Essex locations for COBOL or PL/I programmers at various levels of seniority. Amongst the numerous advantages of working for a manufacturer apart from higher pay are the scope and variety of projects, the opportunity of learning new languages and exposure to a range of hardware. These benefits can rarely be offered within an end user environment. You will certainly be called upon to shoulder more responsibility than you have done in the past and will be given a degree of autonomy which will lead to full benefit will give you a new horizon of freedom. Can you offer 2.5 years plus COBOL experience in any major manufacturer's mainframe?</p> |  <p>SYSTEMS PROGRAMMERS</p> <p>SOUTH EAST & EEC £6-8K - £9-15K</p> |  <p>MATRIX</p> <p>360 Oxford Street London W1N 9HA</p> <p>01-491 4636</p> |

COMPUTER ENGINEERS

£6,000 + COMPANY CAR

U.K. subsidiary of progressive American company requires experienced Engineers to work a shift rota in a demanding environment.

The company, a leader in the field of Oil Exploration, is based in one of the nicest parts of Sussex.

Benefits include Pension Scheme, Life Insurance, Company Car and possibility of foreign travel as nno's career develops.

For further details contact Ted Tinsley on East Grinstead 28111.

MERTHYR TYDFIL BOROUGH COUNCIL
APPOINTMENT OF PRINCIPAL
ASSISTANT (COMPUTERS)
SALARY GRADE SO11 (£3,232 TO £5,528)

Applications are invited from experienced and competent programmers to PLANNING and BUDGETING for this post at the level of the Programming Section, Section 1. The holder of this post deputises for the Computer Manager, Section 1. The holder must have experience of GEDGEO II Operating System and, preferably, have previous experience of Tymshare. A suitable knowledge of PLANNING will be considered an advantage.

APPOINTMENT OF PROGRAMMER / ANALYST (COMPUTER SECTION)
SALARY GRADE AP3 (£3,732 TO £4,148)

Programmers with at least two years' experience in LOGO III and in PLANNING are invited to apply for this post. Previous system analysis experience is desirable.

The successful candidate will be employed on a full-time basis. The post involves a combination of regular and irregular (normal) expenses reimbursed. Consideration of salary dependent on qualifications and experience.

Application forms and further particulars of these posts can be obtained from the Personnel Officer, 2nd Floor Walk, Merthyr Tydfil, Tel No. 0443 614132 (ext. 218).

Closing date for applications is - 24 May 1979

Town Hall Merthyr Tydfil
Maid Glam.

SELWYN JONES
CHIEF EXECUTIVE AND TOWN CLERK



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A Change in Your Career?
A New House in the Country?
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Computer Aided Design
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Pleasantly situated adjacent to the Cotswold Hills in Tewkesbury Racal-Redac Limited develops software to produce complete interactive Graphic based Computer Aided Design Systems using the DEC PDP11 Computer.

Our systems are sold worldwide and are utilised in the design of Printed Circuit Boards and Integrated Circuits.

We are now extending our expertise and developing advanced software for use in the design of the new breed of sophisticated LSI chips and microprocessors. We are also currently involved in producing a Computer Aided Mechanical Design System based on the DEC PDP11. This will entail considerable expansion in our Software Departments and consequently we have a number of opportunities for programmers at all levels.

Development Programmers
 Applicants should hold a Science based degree or HNC qualification and have a working knowledge of Fortran or Assembler. Previous experience in a software environment is desirable although specific vacancies exist for newly qualified personnel. The programmers appointed will work in small teams on Development projects using a range of in-house computers.

Customer Service Programmers
 In constant liaison with our customers the Customer Service group provides a fast and efficient service using software to solve customers' day to day problems. The work is interesting and varied and sometimes entails visiting the customer's location both in the UK and Europe.

Customer Project Programmers
 Customer Project Programmers work on short term projects from the initial analysis stages through to coding and testing to produce high quality software to meet the customers' specifications. This often involves introducing new items of hardware or adding new facilities to our already proven software.

Applicants will hold a relevant degree or HNC qualification and must have had at least 12 months experience in a software environment.

Promotion prospects are excellent as it is anticipated that continuing expansion will create additional Senior level positions in the future.

In addition to excellent starting salaries, Racal employment benefits include a Company Pension and Free Life Assurance Scheme and over 4 weeks annual holiday. Relocation assistance will be provided in appropriate cases.

Please write enclosing details of age, experience and present salary to:
 B. Ashcroft, Personnel Officer, Racal-Redac Limited, Newtown, Tewkesbury, Gloucester, GL20 8HE
 or Telephone Tewkesbury 294161 for more information.

Handwritten signature: John M. Little

COMPUTER PERSONNEL Maths Services

The Warton Division of British Aerospace is making major contributions to Europe's largest and most advanced aircraft programme, the tri-national Tornado multi-role combat aircraft, and to other important projects.

The following personnel are required to join a team working towards installation. In mid '79, an IBM 3032 under MVS/JES2, TSO, JCL and JCL ARS and DEC PDP8 and VAX computers.

Computer Operations Manager

To manage the day-to-day running of the installation with particular emphasis on management of the 30 computer operators working a 3-shift system.

Applicants must be over 30 and have 5 years' experience in computer operations including management experience.

Systems Programmers

Staff with 2 years' relevant experience are required to join teams:

- (i) generating, modifying and tuning an MVS/SE system with JES2/NJE and TSO/TCAM.
- (ii) implementing and supporting systems on DEC PDP II's and VAX II/780's.

Computer Education Officer

To join a team providing programmer training using modern techniques including IBM's Interactive Instructional System.

Applicants must have 1-2 years' programming experience in FORTRAN on IBM systems.

Suitably qualified personnel (male/female) are invited to apply giving brief details of their background and experience, quoting reference No. CW11779

There is a choice of rented housing at attractive prices in pleasant residential areas within comfortable commuting distance from Warton.

Mrs. E. A. Hall,
Senior Personnel Officer,
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Warton Division,
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Froston, Lonsdale, PR4 1AX.



BRITISH AEROSPACE
AIRCRAFT GROUP

Warton Division

FAREHAM BOROUGH COUNCIL
Borough Treasurer's Department

The Council's present computer installation a Honeywell 125 Disk and Magnetic Tapes is to be replaced in 1978 with Honeywell Level 64/20 Disk and Magnetic Tapes in conjunction therewith the Council proposes to expand their present team of Systems Analysts and programmers.

SYSTEMS AND PROGRAMMING MANAGER
Post T90/2 Grade PO 13-71 (£8069-£6702 per annum inclusive)

This is a new post. The person appointed will supervise a systems Analysts and Programming team and be responsible for the design, specification, testing and maintenance of both on line and batch systems. The ability to liaise with user staff at all levels is essential. Applicants should also have at least 5 years' experience as senior management level in developing computer applications.

COMPUTER PROGRAMMER
Post T 83 Grade AP 3/4 (£3732-£4532)

Work includes development of new applications of both on-line and batch systems, and maintenance of existing applications. Applicants must have at least 2 years' relevant experience and be competent in the use of COBOL. The remuneration scale will be determined having regard to experience.

100% removal entitles up to £600 payable towards legal and estate agents fees and generous disturbance and separation allowances. Flexible working hours. Temporary housing accommodation may also be available.

For application forms and further details send to the Personnel and Management Services Office, Box No. 116, Fareham Borough Council, Conic Way, Fareham, Hants. PO16 7PP (Tel. Fareham 336100, ext. 222).

Closing date for receipt of applications 22nd January, 1978.

Fareham
Borough Council

INDALEX

Analyst/ Programmer

C £5,500 — Cheltenham

We have on **LC1 2803 and ED8 30's.**

We seek an experienced **Analyst/Programmer** (male/female) who can quickly contribute to the current projects such as, on line order entry, shop floor data collection (using 7602 commas kit) and implementation of a new payroll package.

Suitable applicants, should preferably have experience of **Cobol** and **On Line Working**. This Senior Staff position carries an attractive remuneration package. Please write with brief details to **Mr. G. M. Chailfield, Personnel Manager.**

Indalex Limited, Kingsditch Lane, Cheltenham
Telephone 21641

LEEDS

SYSTEMS ANALYSTS
to £5500 + bonus

PROGRAMMERS
to £4300 + bonus

Our client has a number of interesting vacancies for systems analysts and programmers.

The company is highly profitable and part of a major British industrial group and uses the latest I C L equipment.

The data centre in Leeds is the headquarters of the European arm of the Company and some infrequent travel could be involved.

The work is interesting and the installation is already well established and much of the work already processed is on-line. It follows that future developments will follow this pattern.

Excellent prospects, working conditions and promotion potential. Salary around £4300 for programmers and to £5500 for analysts PLUS BONUS.

Contact Ivor Norton, in confidence, quoting reference CW/79002.

Ivor Norton Management Services Ltd
Recruitment Consulting Division
62 Shaftsbury Avenue, London W1V 2PL
Tel: 074 68163 • 24 hour answering service
P.O. Box 115, Lipholt Island House
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100

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Fed-up with shift working and you enjoy dealing with people? Then if you have T.P. experience on Iprelath-it IBM machine apply now. This with-it firm offers top grade perks plus full training facilities. CW 1/1

OPERATORS/ SENIOR OPERATORS

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A major engineering firm (offering an excellent relocation package) wishes to recruit several ICL Gil or Gil operators. Other top perks include excellent training, 4 weeks' hols and non-C.P.S. with prospects of programming eventually. CW 1/2.

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A major commercial user with an international reputation requires IBM operators with advanced IBM OS experience. Their very latest IBM equipment has a most up-to-date T.P. system, and therefore T.P. and JCL experience is a definite advantage. Perks include a definite hols, paid overtime, free coffee, discounted BUPA scheme etc. CW 1/3.

OPERATORS

to £5,100 Inc. **LONDON**
If you like working for a financial institution and would enjoy all the perks this implies then apply now. All you need is year 1 OOS /VS experience with the will to work hard. Offer excellent perks and chance Non-C.P.S. subsidized pension and being very close to shops. CW 1-4

OPERATORS

to £4,300 Inc. **NR. ILFORD**
If you are interested in moving onto a new ICL 2900 series, this vacancy is for you. At present they have on ICL 1900, so they need Gil experienced operators to work on their 2 shift system. Nice perks and occasional paid overtime. CW 1/5

DEC OPERATORS

to £5,600 **LONDON AND HOME COUNTIES**
We now have eight vacancies for PD operators in the following locations: The City; Central London, Crawley and Reading, under various shift systems. All firms offer excellent perks. CW 1/6.

OPERATORS/ SENIOR OPERATORS

£3,800 to £7,000 Inc. **NR. LONDON**
So you have OOS or DOS /VS experience — good. Why not advance to the senior grade based on your 18 months' experience and earn a top salary? This consumer manufacturing firm has a really terrific package of perks. CW 1/7

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Mrs B. Lehmann

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 26 (Chock-a-Block)

We leave this to her fate, and repeat Hex who is a prisoner at Fort Ruffian. He has been led up from the dungeons for a meeting with the obdurate DPM.

HEX waited apprehensively in the starkly furnished office for the DPM to appear.

A disembodied voice filled the room. "Do you know why you are here?"

Recognition was instantaneous. There could be no mistake. It was the voice of his father, Abraham Synapse, alias Dr Null.

"You sound like my father," said Hex. "but you're not Dr Null."

"Right on both counts," came the reply.

Hex looked around for the source of the sound. "Who are you? Why won't you show your face?" he asked.

"The Data Processing Manager has no face. I am the System Incarnate, representative of UNUS itself. I am purely procedural, untrammelled by the grossness of a corporeal embodiment. That is why I did not contradict you when you took me for your father (though certainly I am not Dr Null). You are all my children."

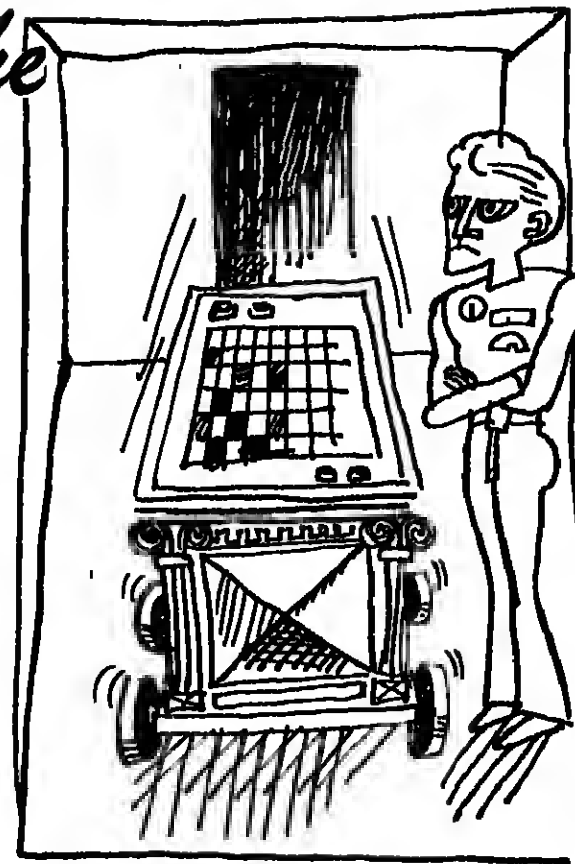
"Why have you stolen my real father's voice?"

"May I ask to whom you refer?"

"Abraham Synapse, creator of you and your ilk," replied Hex.

"You are in need of a short history lesson. Abraham Synapse was indeed one of the co-founders of the System, though not so pre-eminent among them as you seem to imagine, but neither are you his son, nor was 'Dr Null', as that fraudulent impostor styled himself, a relative of his, let alone the professor himself. If any may claim to be his descendant it is I, for his offspring were not flesh and blood. The man under whose malign influence you fell all too readily was none other than Igor Gligolski. He passed himself off under many guises. One of his impostures was in pretence to be Abraham Synapse, a pretence he could make superficially convincing because he had worked with Synapse in the USSR before being expelled. You were easily duped."

Hex had been expecting an attempt to discredit his father's memory, but not a slur as subtle as this; however, he was not going to give up his convictions. "Why then do



you, as System overlord, resort to his video to cover your facelessness? Surely that substantiates his claim?"

"I am afraid not. This video is just one among many. I wear it like a garment, partly for your sake, partly out of nostalgia. It is Gligolski, to give him his due, who designed the first practicable spoken output generator. When he fled Russia he pilched many of Synapse's ideas. In those days North America and Eurasia were densely populated, and he was welcomed with open arms. Consequently the North American Network, of which I am the logical outgrowth, was equipped with Gligolski's phonemic synthesizers. But I am no longer restricted to my native accent. The last sentence was spoken in Hex's own voice. His unmarked him more than anything the DPM had said. "This why should he want to be in me?"

"First because he needed a qualified successor; second because of his deep seated inferiority complex. He knew his inventions were little more than carbon copies, the real originator was his tutor, colleague and rival, Abraham

Synapse. On the one hand he aspired to emulate the professor, even taking his name; on the other he sought to denigrate his findings, and ultimately to destroy his work."

"Then who was my father?"

"Your biological father, for what it is worth, was a psychiatrist called Sigmund Zilch. He emigrated from Budapest to America shortly before your birth. You were born Samuel Zilch — no connection with Gligolski or Synapse. You owe allegiance to no one but me."

"Sam Zilch," murmured Hex. "that's the name I give when challenged. I thought I made it up on the spot."

"A residual memory trace, no doubt, left over after cybernation."

"At least I'm still Sam," thought Hex. It was consoling to have one constant factor running like a thread through the labyrinth of his identity.

"Now it is time you answered my original question: do you know why you are here?"

"Because I was tricked by your clockwork copper, that puny amateur psychologist, Extracode."

"That may be true, but it is not an answer."

"I don't know. You tell me."

"To play a game of chess, or rather two games."

"Chess?"

There was a whirring of well-oiled gears, and a panel at the back of the office slid open. An ornate carved table on wheels emerged from the recess, humming as it moved.

The DPM introduced it. "This is Checkmate (Chess Heuristic Evaluation Computer, Knowing Midgame And The Endgame). He has challenged you to a match. Scoring will be one point for a win, half for a draw. You will play twice, once with white and once with black. To win you need at least 1 1/2 points; if the scores end level, the machine is the winner. If you succeed, the reward is a job on the Future System project; if you fail, you will go back to jail to await execution."

"What makes you so sure I want to work for you?"

"Let us discuss that after the game, shall we?"

The trolley drew up by Hex. On its top was a glass checker pattern, images of the pieces in their initial configuration were projected from underneath.

"As a concession, you may choose whether to have white or black first," announced the DPM.

"I'll have white," stated Hex boldly. "and I shall need a second. If we're to do this properly, we must also agree on an impartial referee. I nominate McNull as my second and Simula as referee."

"You are in no position to lay down terms."

"Then I won't play." Hex was pandering. If the DPM took so much trouble to arrange a game, there had to be an ulterior motive.

"Very well, the game is forfeit."

The main door opened. Hex's coded escorts re-entered. "Take him back to the cells," ordered the DPM.

"Chew!" shouted Hex as they dragged him away.

Has Hex been fooled? Find out next week.

By Richard Forsyth

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Applications should be sent to the Secretary, University of Warwick, Coventry CV4 7AL. To whom written applications (no formal letters) should be sent by 15th January 1979. Please quote Ref. No. 20/87/78.

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BOOK REVIEWS

An aid to reading technical literature

Ocean's Acronyms: A dictionary of abbreviations and acronyms used in scientific and technical writing, by Emanuel Benjamin Ocean. 262pp. £8.75. Routledge and Kegan Paul.

UNDERSTANDING abbreviations and acronyms is always a problem in reading technical literature, particularly in computing, and therefore a good dictionary of these would be extremely useful. A librarian at the Civil Aviation Authority, Emanuel Ocean, has compiled this volume by scanning journals in the Science Reference Library and his own library over the last two to five years, classifying the abbreviations under a range of headings such as Aeronautics, Behavioural Sciences, Geosciences, and so forth.

Since such a book involves no style or editorial skill, it can only be judged on its completeness and accuracy. As a fairly quick test of these, I thought of some non-obvious but significant abbreviations in the computer field and checked to see if they were included. A surprisingly large number were not. Among those missing were: APC, CAPS, HDLC, SNA, PTT, and BCPL. MOS is given under Computer Science, but CMOS is only under Electrical Engineering. PBX is under Computer Sciences but not under Communications. SDI is not under Information Retrieval, and is given two different definitions: Select Dissemination of Information (Computer Sciences) and Selective Dissemination of Information (Photography). The first is obviously a mistake. Thinking of a few examples outside computing: TDC (Top Dead Centre), TNT, and Sonar are missing, as is Quasar. (It does give QRS and QSS, which it defines as Quasi Stellar Radio Sources and Quasi Stellar Sources; they should of course be Stellar — Stella was Jonathan Swift's girlfriend! There are plenty of abbreviations from the Apollo programme but of those I recall from television programmes, AOS, LOS, and DOI are not in the dictionary.

I also spent some time just leafing through the book at random, and the number of errors that I noticed is probably the most disturbing aspect of this work. Some of the mistakes are quite comical apparently in Lunar Sciences CM means

Commend Nodule. A subject heading referred to several times is Data Science, which is something I have never heard of. Some of the classifications are most mysterious: why should AC be under Mathematics, Inhibitory Post Synaptic Potentials under Management, and Apollo under Surface Experiment package not under Lunar Sciences? If a cursory examination finds as many mistakes as this, one can only assume that in actual use a great many difficulties would arise. Clearly the author's approach is unsound. He should at least have had people knowledgeable in each subject field check through the material, just to spot the glaring errors and omissions. Use of thesaurus-generation software, a well-established technique now, would also help to make the book more consistent.

I did learn one interesting fact: in Dairy Sciences, BWP stands for Brown Wrapping Paper.

RORY JOHNSTON

Falls far short of expectations

Choosing A Computer 1978/79, by Clare Smyth and Paul Broadhead. 272pp. £6 (free to subscribers to "Data Systems"). Embankment Press.

FOR several years, the publication "Choosing a computer" has been a valuable desk-side companion to the DPM. Among many other admirable qualities, it included a comprehensive list of equipment manufacturers covering such basic information as price, power and performance. Unfortunately, this practical formula has been

abandoned, and the latest edition falls far short of expectations. Contents are selective, often inaccurate and frequently irrelevant. The new book incorporates a Conference and Exhibition Year Planner, covering the period April 78 to April 79. As can be expected in a volume already somewhat dated on publication, conference activity listing is somewhat sketchy beyond November 1978.

The chief criticism of the book — one which it must be admitted applies to many such publications — is the lack of a clearly defined

15 years' knowledge

Database organisation for data management, by Sakit Ghosh. £23.10 Academic Press Inc. (London) Ltd. 24-28, Weymouth Road, London, NW1 7DX.

THIS book contains most of the knowledge gained by the author during his 15 years with the research division of IBM. It uses basic mathematical concepts to describe data, and characterises the hardware for storing data and development techniques for storing, retrieving and modifying data.

It is a useful mathematical treatment of the methods of storing and accessing data on large computers.

GEOFFREY BAKER

Comprehensive account of Pascal

Programming in Pascal, by Peter Grugoso. 359 pp. £7.50. Addison-Wesley.

DISAGREEMENT with the first sentence did not leave me in the best frame of mind to perform an objective appraisal of this book. However, by the time I had reached the final section (with its pungent mention of Simula) my fear that this would be just another passenger on the Pascal bandwagon had been firmly dispelled.

This book contains a comprehensive account of the Pascal programming language and a good deal more besides. The syntactic and semantic issues are in-

terspersed with perceptive suggestions on good practice and style. In addition to the language description, the book encompasses various other topics, including worthwhile introductions to list and tree structures and program verification.

On sensitive issues such as "top-down" versus "bottom-up" global variables and GOTO statements, the author adopts a middle of the road attitude, achieving a comfortable balance between pragmatism and dogma.

I would dispute the author's claim that this book is suitable for readers with no prior knowledge of a programming language. The author has a slight tendency to make points by inference rather than positive statement, leaving the reader to draw conclusions from the examples.

Fortunately, this minor defect is largely compensated for by the presence of more pertinent and sometimes quite elaborate examples. "Programming in Pascal" has been produced from the author's camera-ready copy prepared, apparently, on an electric typewriter. In view of this method of production, I feel that at £7.50 (plus back) the book is somewhat over-priced, but nevertheless in terms of content much better value than some of its contemporaries.

R. KEE
